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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950
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August 25, 2016

16-NWP-144

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Washington Closure Hanford, LLC
2620 Fermi Avenue, MSIN: H4-24
Richland, Washington 99354

Mr. Mark A. Lindholm, President
Washington River Protection Solutions
PO Box 850, MSIN: H3-21
Richland, Washington 99352

Re: Transmittal of the Department of Ecology's Legal Copy of the *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste* (Site-wide Permit), WA7890008967, Quarter Ending June 30, 2016

Reference: See page 3

Dear Ladies and Gentlemen:

The Department of Ecology (Ecology) reviewed the referenced letter and enclosure to confirm that all Class 1 and Class [1]1 modifications to the Site-wide Permit for the quarter ending June 30, 2016, were identified, reviewed, and approved. The modifications are incorporated in the Site-wide Permit.

All permitting and compliance work must be completed under the legal version of the Site-wide Permit. The enclosed DVD contains the legal copy of the Site-wide Permit.

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Legal hard copies of the Site-wide Permit are on file at the locations listed below.

Department of Ecology	United States Department of Energy
Nuclear Waste Program	Administrative Record
3100 Port of Benton Boulevard	2440 Stevens Center Place
Richland, Washington 99354	Richland, Washington 99354

A copy of the Site-wide Permit is on the web at http://www.ecy.wa.gov/programs/nwp/permitting/hdwp/rev/8c/. Individuals can request copies of the Site-wide Permit on DVD by contacting Ecology's Resource Center at (509) 372-7920.

Portions of the Site-wide Permit contain Confidential Business Information and Official Use Only documents. This information is not available for public review.

The following Class 1 and Class [1]1 modifications are approved this quarter:

331-C Storage Unit

PCN-331-C-2016-01:

- 331-C Storage Unit Permit Conditions, Class [1]1 Modification, June 28, 2016.
- Addendum A (Part A Form), Class [1]1 Modification, June 28, 2016.
- Addendum H (Closure Plan), Class [1]1 Modification, June 28, 2016.

PCN-HFSW-2016-04:

- Part I Standard and Part II General Facility Conditions, Class [1]1 Modification, June 28, 2016.

PCN-HFSW-2016-05:

- Permit Attachment 3 (Security), Class [1]1 Modification, June 28, 2016.

PCN-HFSW-2016-06:

- Permit Attachment 9 (Permit Applicability Matrix), Class [1]1 Modification, June 28, 2016.

400 Area Waste Management Unit (WMU)

PCN-400WMU-2016-01:

- Addendum E (Procedures to Prevent Hazards), Class 1 Modification, June 13, 2016.

PCN-400WMU-2016-02:

- 400 Area WMU Permit Conditions, Class 1 Modification, June 13, 2016.

Integrated Disposal Facility (IDF)

PCN-IDF-2016-01:

- IDF Permit Conditions, Class 1 Modification, June 27, 2016.
- Appendix 4A (Phase 1 Critical Systems Design Report), Class 1 Modification, June 27, 2016.

Liquid Effluent Retention Facility (LERF) & 200 Area Effluent Treatment Facility (200 Area ETF)

PCN-LERF/ETF-2015-02:

- LERF & 200 Area ETF Permit Conditions, Class 1 Modification, June 13, 2016.
- Addendum A (Part A Form), Class [1]1 Modification, June 13, 2016.
- Addendum B (Waste Analysis Plan), Class [1]1 Modification, June 13, 2016.
- Addendum C (Process Information), Class [1]1 Modification, June 13, 2016.
- Addendum F (Preparedness and Prevention), Class [1]1 Modification, June 13, 2016.
- Addendum H (Closure Plan), Class [1]1 Modification, June 13, 2016.
- Addendum I (Inspection Requirements), Class [1]1 Modification, June 13, 2016.
- Addendum J (Contingency Plan), Class [1]1 Modification, June 13, 2016.

Waste Treatment and Immobilization Plant (WTP)

24590-WTP-PCN-ENV-14-002:

- WTP Permit Conditions and Appendix 6.2 (Final Risk Assessment Work Plan), Class [1]1 Modification, May 2, 2016.

If there are any questions regarding this letter, please contact Debra Alexander, Site-wide Revision 8C Dangerous Waste Permit Coordinator, at debra.alexander@ecy.wa.gov or (509) 372-7896, or Annette Carlson, Configuration Control Permit Coordinator, at annette.carlson@ecy.wa.gov or (509) 372-7897.

Sincerely,

Suzanne Dahl
Dangerous Waste Permit Manager
Nuclear Waste Program

jc/jt
Enclosure

cc: See page 4

Reference: Letter 16-ESQ-0101, dated July 11, 2016, from S. Charboneau, USDOE-RL, to S.L. Dahl-Crumpler, Ecology, "Class 1 Modifications to the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit, Quarter Ending June 30, 2016" cc electronic w/o enc:

Dave Bartus, EPA
Dennis Faulk, EPA
Cliff Clark, USDOE
Rob Hastings, USDOE
Lori Huffman, USDOE
Tony McKarns, USDOE
Barry Curn, BNI
Brad Erlandson, BNI
Roger Landon, BNI
Sandi Murdock, BNI
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Mandy Jones, Ecology
Ron Skinnarland, Ecology

cc w/enc, DVD:

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Mike Livingston, WDFW
John Martell, WDOH
John Wiesman, WDOH
Ted Maxwell, WSDA
Allyson Brooks, WSDAHP
Shane Early, WSDNR
BNI Correspondence Control
CHPRC Correspondence Control
Environmental Portal
Gonzaga University Foley Center Library
Hanford Facility Operating Record
MSA Correspondence Control
PNNL Correspondence Control
Portland State University Library, Government Information
University of Washington Suzzallo Library, Government Publications
USDOE-ORP Correspondence Control
USDOE Public Reading Room, CIC
USDOE-RL Correspondence Control
USEPA Region 10 Correspondence Control
USEPA Region 10 Hanford Field Office Correspondence Control
WCH Correspondence Control
WRPS Correspondence Control

cc w/enc, DVD, and hard copy:

Administrative Record: Hanford Site-wide Permit
NWP Central File
NWP Library

cc w/o enc:

NWP Reader File

Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste

Change Control Log

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated and transparent manner. Each unit or section of the permit will have a "**Last Modification Date**" which represents the last date the unit or section has been modified. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit. An individual unit change control log will be placed at the beginning of each unit so that changes to individual addendum of the unit are tracked and reflected.

Revision 8C last issue date **August 25, 2016**

Unit or Section	Last Modification Date	Modification Number
Attachments		
Hanford Facility Agreement and Consent Order	11/03/2015	
Hanford Facility Permit Legal Description	09/30/2011	
Security	08/25/2016	8c.2016.Q2
Hanford Emergency Management Plan	07/17/2014	
Hanford Facility Personnel Training Program	09/30/2015	8c.2015.Q3
Recordkeeping and Reports	09/30/2015	8c.2015.Q3
EPA Policy on Remediation of Existing Wells	06/1990	
Hanford Well Maintenance and Inspection Plan	04/2014	
Permit Applicability Matrix	08/25/2016	8c.2016.Q2
Strategy for Handling and Disposing of Purgewater	09/30/2010	
Part I and II		
Conditions	08/25/2016	8c.2016.Q2
Part III Operating Units		
242-A Evaporator	2/18/2016	8c.2015.Q4
325 Hazardous Waste Treatment Units	05/23/2016	8c.2016.Q1
~~331-C Storage Unit~~ - Removed	08/25/2016	8c.2016.Q2
400 Area Waste Management Unit	08/25/2016	8c.2016.Q2
Integrated Disposal Facility (IDF)	08/25/2016	8c.2016.Q2
Liquid Effluent Retention Facility (LERF) & 200 Area Effluent Treatment Facility (ETF)	08/25/2016	8c.2016.Q2
PUREX	06/30/2012	

Unit or Section	Last Modification Date	Modification Number
Waste Treatment and Immobilization Plant (WTP)	08/25/2016	8c.2016.Q2
Part IV Corrective Action		
100-NR-1	01/2007	
Part V Closure Units		
1301-N-Liquid Waste Disposal Facility	01/2007	
1324-N- Impoundment & 1324-NA Percolation Pond	06/30/2008	
1325-N Liquid Waste Disposal Facility	10/26/2005	
FS-1 Outdoor Storage Container Area	01/21/2016	8c.2016.2F
Waste Encapsulation and Storage Facility (WESF), Hot Cells A through F	07/01/2016	8c.2016.5F
Part VI Post Closure Units		
183-H Solar Evaporation Basins	08/13/2013	
300 Area Process Trenches	10/1/2008	

PERMIT ATTACHMENT 3
SECURITY

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PERMIT ATTACHMENT 3
SECURITY

TABLE OF CONTENTS

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3 SECURITY

This Attachment addresses provisions contained in Hanford Facility Permit, WA7890008967 (Permit) Condition II.M.

The following sections describe the security measures, equipment, and warning signs used to control entry to the Hanford Facility at the facility level according to Permit Condition II.M. Additional security information for individual treatment, storage, and disposal (TSD) units and unit groups is located in the unit specific Permit conditions in Chapters III, V, and VI of this Permit.

3.1 Security Procedures and Equipment

This section describes the warning signs, 24-hour surveillance system, and barriers used to provide security and control access to the Hanford Facility, including active portions of the facility. The active portion of the facility means that portion of the facility where treatment, storage, or disposal of dangerous/mixed waste occurs.

3.1.1 Warning Signs

Operating TSD units and unit groups must comply with the requirements found in WAC 173-303-310(2)(a) regarding the placement of signs. Security information for operating TSD units and unit groups regarding the placement of signs is provided in the unit specific Permit conditions. Security information for non-operating TSD unit groups incorporated into the Permit Part III, Part V, or Part VI regarding the placement of signs is determined on a case-by-case basis. Typically, the Hanford Facility signs described below will be sufficient for non-operating unit.

Signs are posted at area boundaries within the Hanford Site stating *No Trespassing. Security Badges Required Beyond This Point. Authorized Vehicles Only. Public Access Prohibited* (or an equivalent legend). In addition, warning signs stating *Danger Unauthorized Personnel Keep Out* (or an equivalent legend) are posted at operating TSD units or unit groups or at active portions of operating TSD units or unit groups within the Hanford Facility. These signs are written in English, legible from a distance of 7.6 meters, and visible from all angles of approach.

3.1.2 Surveillance System

The entire Hanford facility is a controlled access area. The Hanford facility maintains 24-hour surveillance and access control systems for protection of government property, classified information, and special nuclear materials. The Hanford Patrol maintains a continuous presence of protective force personnel to provide additional security.

All personnel accessing locations on the Hanford Site (except for publicly accessible locations) must possess and display a U.S. Department of Energy (DOE) issued security identification badge indicating the appropriate authorization. All personnel entering or exiting the Hanford Site are subject to random security badge inspections by protective force personnel to validate access authorization. All vehicles and hand-carried items entering or exiting the Hanford Site are subject to random security inspections and searches by protective force personnel to validate access authorization and preclude the unauthorized introduction of prohibited/controlled articles, or the unauthorized removal of government or contractor assets. The surveillance systems in place satisfy the security requirements of WAC 173-303-310(2)(b), (a 24-hour surveillance system) at the Hanford Facility level.

3.1.3 Natural or Artificial Barriers

The majority of TSD units and unit groups are located within the controlled access area of the Hanford Site. Vehicular access to roads leading to the controlled area is through 24-hour controlled access points at the Wye, Yakima, and Rattlesnake barricades. The barricades are posted with restrictive signage to meet security requirements at the Hanford Facility level for the 100 Areas, 200 Areas, and 600 Area TSD units and unit groups. Perimeter fences, restrictive signage, and random protective force patrols are used to control access to the 300 Area and 400 Area. Additional means to bar entry or control access (e.g., fences, locked entry doors) are discussed, as necessary, for the 325 Hazardous Waste Management Unit and the 400 Area Waste Management Unit in their unit specific Permit conditions.

The Hanford Facility level security systems are also in place to satisfy the security requirements of WAC 173-303-310(2)(c), (artificial or natural barriers).

PERMIT ATTACHMENT 9
PERMIT APPLICABILITY MATRIX

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PERMIT ATTACHMENT 9
PERMIT APPLICABILITY MATRIX

PART I									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
I.A.	**EFFECT OF PERMIT**								
I.A.1.		*	*	*	*	*	*	*	
I.A.2.		*	*	*	*	*	*	*	
I.A.3.		*	*		*	*	*	*	
I.A.4.	Coordination with the HFFACO		*		*	*	*	*	
I.B.	**PERSONAL AND PROPERTY RIGHTS**		*		*	*	*	*	
I.C.	**PERMIT ACTIONS**								
I.C.1.	Modification, Revocation, Reissuance, or Termination		*		*	*	*	*	
I.C.2.	Filing of a Request		*		*	*	*	*	
I.C.3.	Modifications		*		*	*	*	*	
I.D.	**SEVERABILITY**								
I.D.1.	Effect of Invalidation		*		*	*	*	*	
I.D.2.	Final Resolution		*		*	*	*	*	
I.E.	**DUTIES AND REQUIREMENTS**								
I.E.1.	Duty to Comply		*		*	*	*	*	
I.E.2.	Compliance Not Constituting Defense		*		*	*	*	*	
I.E.3.	Duty to Reapply		*		*	*	*	*	
I.E.4.	Permit Expiration & Continuation		*		*	*	*	*	
I.E.5.	Need to Halt or Reduce Activity Not a Defense		*		*	*	*	*	
I.E.6.	Duty to Mitigate		*		*	*	*	*	
I.E.7.	Proper Operation & Maintenance		*			*	*	*	
I.E.8.	Duty to Provide Information		*		*	*	*	*	
I.E.9.	Inspection & Entry		*		*	*	*	*	
I.E.10.	Monitoring & Records								
I.E.11.	Reporting Planned Changes		*			*	*	*	
I.E.12.	Certification of Construction or Modification		*				*		
I.E.13.	Anticipated Noncompliance		*		*	*	*	*	

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land
B. North Slope and ALE
C. Interim Status TSD Units
D. Areas Between TSDs (excluding A and B)
E. TSD Unit Closures (in Part V)
F. TSD Operating Units (in Part III)
G. TSD Units in Post-Closure/Modified Closure (in Part VI)

* Condition applies to this category, as modified by applicable footnotes and qualifiers.

1 – For Category B, Part I Conditions only apply if future TSD activities are begun on the North Slope or ALE.
2 – For Category C, all Part I Conditions apply to activities subject to Conditions II.U. and II.V.
3 – For Category D, Part I Conditions only apply to activities subject to Conditions II.A., II.C., II.D.4., II.G., II.I., II.L.2.e, II.O., II.Q., II.S., II.T., II.X., and II.Y.

PART I									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
I.E.14.	Transfer of Permits		*			*	*	*	
I.E.15.	Immediate Reporting		*		*	*	*	*	
I.E.16.	Written Reporting		*		*	*	*	*	
I.E.17.	Manifest Discrepancy Report								
I.E.17.a			*			*	*	*	
I.E.17.b			*		*	*	*	*	
I.E.18.	Unmanifested Waste Report		*			*	*	*	
I.E.19.	Other Noncompliance		*		*	*	*	*	
I.E.20.	Other Information		*		*	*	*	*	
I.E.21.	Reports, Notifications, & Submissions		*		*	*	*	*	
I.E.22.	Annual Report		*		*	*	*	*	
I.F.	**SIGNATORY REQUIREMENT**		*		*	*	*	*	
I.G.	**CONFIDENTIAL INFORMATION**		*		*	*	*	*	
I.H.	**DOCUMENTS TO BE MAINTAINED AT FACILITY SITE**		*		*	*	*	*	

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land
B. North Slope and ALE
C. Interim Status TSD Units
D. Areas Between TSDs (excluding A and B)
E. TSD Unit Closures (in Part V)
F. TSD Operating Units (in Part III)
G. TSD Units in Post-Closure/Modified Closure (in Part VI)

* Condition applies to this category, as modified by applicable footnotes and qualifiers.

1 – For Category B, Part I Conditions only apply if future TSD activities are begun on the North Slope or ALE.
2 – For Category C, all Part I Conditions apply to activities subject to Conditions II.U. and II.V.
3 – For Category D, Part I Conditions only apply to activities subject to Conditions II.A., II.C., II.D.4., II.G., II.I., II.L.2.e, II.O., II.Q., II.S., II.T., II.X., and II.Y.

PART II									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
II.A.	**FACILITY CONTINGENCY PLAN**								
II.A.1.					*	*	*	*	For Category D, II.A Conditions only apply to releases of hazardous substances that threaten human health or the environment.
II.A.2.					*	*	*	*	
II.A.3.					*	*	*	*	
II.A.4.					*	*	*	*	
II.B.	**PREPAREDNESS AND PREVENTION**								
II.B.1.						*	*		
II.B.2.						*	*		
II.B.3.						*	*		
II.B.4.						*	*		
II.B.5						*	*		
II.C.	**PERSONNEL TRAINING**								
II.C.1.						*	*	*	
II.C.2.					*	*	*	*	
II.C.3.						*	*	*	
II.C.4.					*	*	*	*	For Category D, Condition II.C.4 will not apply to unrestricted (publicly accessible) areas.
II.D.	**WASTE ANALYSIS**								
II.D.1.						*	*	*	
II.D.2.						*	*	*	
II.D.3						*	*	*	
II.E.	**QUALITY ASSURANCE/ QUALITY CONTROL**								
II.E.1.						*	*	*	
II.E.2.						*	*	*	
II.F.	**GROUND WATER AND VADOSE ZONE MONITORING**					*	*	*	

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land	E. TSD Unit Closures (Part V)
B. North Slope and ALE	F. TSD Operating Units (Part III)
C. Interim Status TSD Units	G. TSD Units in Post Closure/Modified Closure (Part VI)
D. Areas Between TSDs (excluding A and B)	

*Condition applies to this category, as modified by applicable footnotes and qualifiers.

PART II									
CONDITION		**CATEGORY**							**QUALIFIERS**
PART	**TITLE**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	
II.F.1.	Purgewater Management			*		*	*	*	
II.F.2.	Well Remediation and Abandonment			*		*	*	*	
II.F.3.	Well Construction			*		*	*	*	
II.F.4.	Annual Groundwater Report Due Date			*		*	*	*	
II.G.	**SITING CRITERIA**				*		*		**For Category D, Condition II.G only applies if a new TSD unit is to be sited.**
II.H.	**RECORDKEEPING AND REPORTING**					*	*	*	
II.I.	**FACILITY OPERATING RECORD**								For Category D, II.I Conditions only apply to activities subject to this Permit as defined by this matrix. For Category E, Condition applicability to be specified in Part V. Condition II.I only applies to existing records and records prepared after the date of Permit issuance.
II.I.1.		*	*		*	*	*	*	
II.I.1.a.		*	*		*	*	*	*	
II.I.1.b.							*	*	
II.I.1.c.					*	*	*	*	
II.I.1.d.						*	*	*	
II.I.1.e.			*		*				
II.I.1.f.					*	*	*	*	
II.I.1.g.						*	*	*	
II.I.1.h.	Reserved Condition								
II.I.1.i.	Reserved Condition								
II.I.1.j.						*	*	*	
II.I.1.k.					*	*	*	*	
II.I.1.l.	Reserved Condition								
II.I.1.m.						*	*	*	
II.I.1.n.					*	*	*	*	
II.I.1.o.	Reserved Condition								
II.I.1.p.			*		*	*	*	*	
II.I.1.q.			*		*	*	*	*	
II.I.1.r.					*	*	*	*	
II.I.1.s.					*	*	*	*	
II.I.1.t.					*	*	*	*	
II.J.	**FACILITY CLOSURE**								

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land	E. TSD Unit Closures (Part V)
B. North Slope and ALE	F. TSD Operating Units (Part III)
C. Interim Status TSD Units	G. TSD Units in Post Closure/Modified Closure (Part VI)
D. Areas Between TSDs (excluding A and B)	

*Condition applies to this category, as modified by applicable footnotes and qualifiers.

PART II									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
II.J.1.						*	*	*	
II.J.2.						*	*	*	
II.J.3.						*	*	*	
II.J.4.						*	*	*	
II.K.	**SOIL/GROUND WATER CLOSURE PERFORMANCE STANDARDS**								
II.K.1.						*	*	*	
II.K.2.						*	*	*	
II.K.3.						*	*	*	
II.K.4.						*	*	*	
II.K.5.						*	*	*	
II.K.6.						*	*	*	
II.K.7.						*	*	*	
II.L.	**DESIGN AND OPERATION OF FACILITY**								
II.L.1.	Proper Design and Construction					*	*	*	
II.L.2.	Design Changes, Nonconformance and as-built Drawings					*	*	*	Condition II.L.2, applies to Categories E & G only if it is a landfill closure.
II.L.2.a.						*	*	*	
II.L.2.b.						*	*	*	
II.L.2.c.						*	*	*	
II.L.2.d.						*	*	*	
II.L.2.e	Facility Compliance				*	*	*	*	
II.M.	SECURITY					*	*	*	
II.N.	**RECEIPT OF DANGEROUS WASTES GENERATED OFF-SITE**								
II.N.1.	Receipt of Off-Site Waste						*		
II.N.2.	Waste From Sources Outside the U.S.						*		
II.N.3.	Notice to Generator						*		

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land	E. TSD Unit Closures (Part V)
B. North Slope and ALE	F. TSD Operating Units (Part III)
C. Interim Status TSD Units	G. TSD Units in Post Closure/Modified Closure (Part VI)
D. Areas Between TSDs (excluding A and B)	

*Condition applies to this category, as modified by applicable footnotes and qualifiers.

PART II									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
II.O.	**GENERAL INSPECTION REQUIREMENTS**								
II.O.1.					*	*	*	*	
II.O.1.a.					*				
II.O.1.b.					*				
II.O.1.c.					*				
II.O.1.d.					*				
II.O.2.					*	*	*	*	
II.O.3.					*	*	*	*	
II.P.	**MANIFEST SYSTEM**								
II.P.1.						*	*	*	
II.P.2.						*	*	*	
II.Q.	**ON-SITE TRANSPORTATION**								
II.Q.1.					*	*	*	*	
II.Q.2.					*	*	*	*	
II.R.	**EQUIVALENT MATERIALS**								
II.R.1.						*	*	*	
II.R.2.						*	*	*	
II.R.3.						*	*	*	
II.S.	**LAND DISPOSAL RESTRICTIONS**				*	*	*	*	
II.T.	**ACCESS AND INFORMATION**				*	*	*	*	
II.U.	**MAPPING OF UNDERGROUND PIPING**								
II.U.1.	Reserved Condition								
II.U.2.	Reserved Condition								
II.U.3.				*		*	*	*	
II.U.4.				*		*	*	*	
II.V.	**MARKING OF UNDERGROUND PIPING**			*		*	*	*	
II.W.	**OTHER PERMITS AND/OR APPROVALS**								
II.W.1.						*	*	*	
II.W.2.						*	*	*	

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land	E. TSD Unit Closures (Part V)
B. North Slope and ALE	F. TSD Operating Units (Part III)
C. Interim Status TSD Units	G. TSD Units in Post Closure/Modified Closure (Part VI)
D. Areas Between TSDs (excluding A and B)	

*Condition applies to this category, as modified by applicable footnotes and qualifiers.

PART II									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
II.W.3.						*	*	*	
II.X.	**SCHEDULE EXTENSIONS**								Condition II.X, only applies to Category C if activities are subject to Conditions II.U, and II.V.
II.X.1.				*	*	*	*	*	
II.X.2.				*	*	*	*	*	Condition II.X, only applies to Category D if activities are subject to this Permit as defined by this matrix.
II.Y.	**CORRECTIVE ACTION**	*	*	*	*	*	*	*	
II.Y.1.	Compliance with Chapter 173-340 WAC	*	*	*	*	*	*	*	
II.Y.1.a.		*	*	*	*	*	*	*	
II.Y.1.b.		*	*	*	*	*	*	*	
II.Y.1.c.		*	*	*	*	*	*	*	
II.Y.1.d.		*	*	*	*	*	*	*	
II.Y.1.e.		*	*	*	*	*	*	*	
II.Y.1.f.		*	*	*	*	*	*	*	
II.Y.1.g.		*	*	*	*	*	*	*	
II.Y.2.	Acceptance of Work Under Other Authorities or Programs and Integration with the HFFACO	*	*	*	*	*	*	*	
II.Y.2.a.		*	*	*	*	*	*	*	
II.Y.2.b.		*	*	*	*	*	*	*	
II.Y.2.c.		*	*	*	*	*	*	*	
II.Y.2.d.		*	*	*	*	*	*	*	
II.Y.3.	Releases of Dangerous Waste or Dangerous Constituents Not Covered by the HFFACO	*	*	*	*	*	*	*	
II.Y.3.a.	U.S. Ecology	*	*	*	*	*	*	*	
II.Y.3.b.	Newly Identified Solid Waste Management Units and Newly Identified Releases of Dangerous Waste or Dangerous Waste Constituents	*	*	*	*	*	*	*	
II.Z	**WASTE MINIMIZATION**								
II.Z.1							*		

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land	E. TSD Unit Closures (Part V)
B. North Slope and ALE	F. TSD Operating Units (Part III)
C. Interim Status TSD Units	G. TSD Units in Post Closure/Modified Closure (Part VI)
D. Areas Between TSDs (excluding A and B)	

*Condition applies to this category, as modified by applicable footnotes and qualifiers.

PART II									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
II.Z.1.a							*		
II.Z.1.b							*		
II.Z.2							*		
II.AA	**AIR EMISSION STANDARDS FOR PROCESS VENTS**						*		
II.BB	**AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS**						*		
II.CC	**AIR EMISSION STANDARDS FOR TANKS, SURFACE IMPOUNDMENTS, AND CONTAINERS**						*		

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land	E. TSD Unit Closures (Part V)
B. North Slope and ALE	F. TSD Operating Units (Part III)
C. Interim Status TSD Units	G. TSD Units in Post Closure/Modified Closure (Part VI)
D. Areas Between TSDs (excluding A and B)	

*Condition applies to this category, as modified by applicable footnotes and qualifiers.

PART III									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
III.	**UNIT SPECIFIC CONDITIONS FOR FINAL STATUS OPERATIONS**								
III.2	PUREX Storage Tunnels						*		
III.3	Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility						*		
III.4	242-A Evaporator						*		
III.5	325 Hazardous Waste Treatment Units						*		
III.10	Waste Treatment and Immobilization Plant						*		
III.11	Integrated Disposal Facility						*		
III.16	400 Area Waste Management Unit						*		
PART IV									
IV.	**UNIT SPECIFIC CONDITIONS FOR CORRECTIVE ACTION**								
IV.1	100-NR-1				*	*			
PART V									
V.	**UNIT SPECIFIC CONDITIONS FOR UNITS UNDERGOING CLOSURE**								
V.1	1325-N Liquid Waste Disposal Facility					*			
V.2	1301-N Liquid Waste Disposal Facility					*			
V.3	1324-N Surface Impoundment &1324-NA Surface Impoundment					*			
V.6	Waste Encapsulation and Storage Facility Hot Cells A through F					*			
PART VI									
VI.	**UNIT SPECIFIC CONDITIONS FOR UNITS IN POST CLOSURE**								
VI.1	300 Area Process Trenches							*	
VI.2	183-H Solar Evaporation Basins							*	

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land	E. TSD Unit Closures (Part V)
B. North Slope and ALE	F. TSD Operating Units (Part III)
C. Interim Status TSD Units	G. TSD Units in Post Closure/Modified Closure (Part VI)
D. Areas Between TSDs (excluding A and B)	

*Condition applies to this category, as modified by applicable footnotes and qualifiers.

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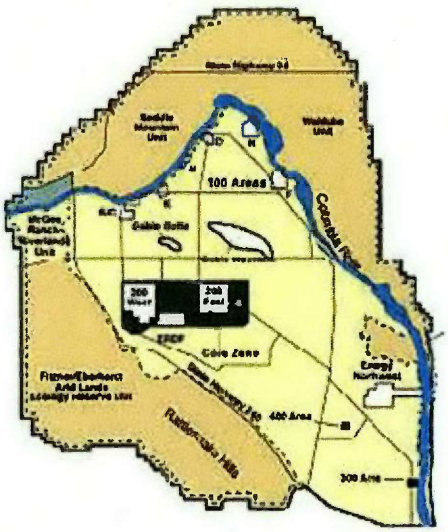
WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion

Revision 8C

For the Treatment, Storage, and Disposal of Dangerous Waste



Washington State Department of Ecology
Nuclear Waste Program

December 2014

For additional copies of this permit contact:

Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354-1670
509-372-7950

The Department of Ecology is an equal-opportunity agency and does not discriminate on the basis of race, creed, color disability, age, religion, national origin, sex, marital status, disabled-veteran status, Vietnam-era veteran status or sexual orientation.

For more information or if you have special accommodation needs, please contact the Nuclear Waste Program at (509) 372-7950.

Department of Ecology Headquarters telecommunications device for the deaf (TDD) number is: (360) 407-6006

DANGEROUS WASTE PORTION OF THE RESOURCE CONSERVATION AND RECOVERY ACT PERMIT FOR THE TREATMENT, STORAGE, AND DISPOSAL OF DANGEROUS WASTE

Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354
Telephone: 509-372-7950

Issued in accordance with the applicable provisions of the Hazardous Waste Management Act, Chapter 70.105 Revised Code of Washington (RCW), and the regulations promulgated there under in Chapter 173-303 Washington Administrative Code (WAC).

ISSUED TO:

United States Department of Energy
Richland Operations Office
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Richland, Washington 99352
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CH2MHILL Plateau Remediation Company
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Telephone: (509) 376-0556

This Permit as modified on October 22, 2007, will remain in effect until reissuance of the September 27, 2004 Permit, unless revoked and reissued under WAC 173-303-830(3), terminated under WAC 173-303-830(5), or continued in accordance with WAC 173-303-806(7).

ISSUED BY:
WASHINGTON STATE DEPARTMENT OF ECOLOGY

_______________________ for   Date: 10/17/07

Jane A. Hedges, Program Manager

Nuclear Waste Program, Department of Ecology

DANGEROUS WASTE PORTION OF THE RESOURCE CONSERVATION AND RECOVERY ACT PERMIT FOR THE TREATMENT, STORAGE, AND DISPOSAL OF DANGEROUS WASTE

TABLE OF CONTENTS

LIST OF ATTACHMENTS

The following listed documents are attached in their entirety. However, only those portions of the attachments specified in Parts I through VI are enforceable conditions of this Permit and subject to the permit modification requirements of Permit Condition I.C.3. Changes to portions of the attachments, which are not subject to the permit modification process, will be addressed in accordance with Permit Conditions I.E.8, I.E.11, I.E.13, I.E.15, through I.E.20, and I.E.22. The Washington State Department of Ecology (Ecology) has, as deemed necessary, modified specific language in these attachments. These modifications are described in the conditions (Parts I through VI), and thereby supersede the language of the attachment.

Attachment 1	Hanford Federal Facility Agreement and Consent Order, (as amended) http://www.hanford.gov/tpa/coverpg.htm
Attachment 2	Hanford Facility Legal Description, from Class [1]1 modification, dated January 7, 1999
Attachment 3	Security, dated September 30, 2010
Attachment 4	*Hanford Emergency Management Plan*, DOE/RL-94-02 Revision 6, as amended and approved modifications
Attachment 5	Hanford Facility Personnel Training Program, dated September 30, 2015
Attachment 6	Reports and Records, dated September 30, 2015
Attachment 7	Policy on Remediation of Existing Wells and Acceptance Criteria for RCRA and CERCLA, June 1990
Attachment 8	Hanford Well Maintenance and Inspection Plan, HNF-56398, Revision 1, April 10, 2014
Attachment 9	Permit Applicability Matrix, dated June 29, 2016
Attachment 10	Purgewater Management Plan, July 1990

INTRODUCTION

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, special nuclear material (as defined by the Atomic Energy Act of 1954, as amended) and/or the radionuclide component of mixed waste has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or Chapter 70.105 RCW.

Pursuant to Chapter 70.105 RCW, the Hazardous Waste Management Act (HWMA) of 1976, as amended, Chapter 70.105D RCW, the Model Toxics Control Act (MTCA), and regulations promulgated there under by the Washington State Department of Ecology (hereafter called Ecology), codified in Chapter 173-303 Washington Administrative Code (WAC), Dangerous Waste Regulations, a Dangerous Waste Permit is issued to the United States Department of Energy (USDOE) - Richland Operations Office (RL) and Office of River Protection (ORP) [owner/operator], and its contractors [co-operators], Bechtel National, Incorporated (BNI), CH2MHILL Plateau Remediation Company (CHPRC), Mission Support Alliance, LLC (MSA)], Pacific Northwest National Laboratory (PNNL), Washington Closure Hanford, LLC (WCH), and Washington River Protection Solutions, LLC (WRPS) and hereafter called the Permittees, for the treatment, storage, and disposal of dangerous waste at the Hanford Facility.

This Dangerous Waste Permit, issued in conjunction with the United States Environmental Protection Agency's (hereafter called EPA) Hazardous and Solid Waste Amendments Portion of the Resource Conservation and Recovery Act (RCRA) Permit for the Treatment, Storage, and Disposal (TSD) of Hazardous Waste (HSWA Permit), constitutes the RCRA Permit for the Hanford Facility. Use of the term "Permit" within the Dangerous Waste Permit will refer to the Dangerous Waste Permit, while use of the term "Permit" within the HSWA Permit, will refer to the HSWA Permit. Use of the same term in both the Dangerous Waste Permit and the HSWA Permit, will have the standard meaning associated with the activities addressed by the permit in which the term is used. Such meanings will prevail, except where specifically stated otherwise.

The Permittees will comply with all terms and conditions set forth in this Permit and those portions of the Attachments that have been specifically incorporated into this Permit. When the Permit and the Attachments (except Permit Attachment 1) conflict, the wording of the Permit will prevail. The Permit is intended to be consistent with the terms and conditions of the Hanford Federal Facility Agreement and Consent Order (HFFACO, Permit Attachment 1). The Permittees will also comply with all applicable state regulations, including Chapter 173-303 WAC.

Applicable state regulations are those which are in effect on the date of issuance, or as specified in subsequent modifications of this Permit. In addition, applicable state regulations include any self-implementing statutory provisions and related regulations which, according to the requirements of the HWMA, as amended, or other law(s), are automatically applicable to the Permittees' dangerous waste management activities, notwithstanding the conditions of this Permit.

This Permit is based upon the Administrative Record, as required by WAC 173-303-840. The Permittees' failure in the application, or during the Permit issuance process, to fully disclose all relevant facts, or the Permittees' misrepresentation of any relevant facts at any time, will be grounds for the termination or modification of this Permit and/or initiation of an enforcement action, including criminal proceedings. The Permittees will inform Ecology of any deviation from the Permit conditions, or changes in the information on which the application is based, which would affect either the Permittees' ability to comply, or actual compliance with the applicable regulations or the Permit conditions, or which alters any condition of this Permit in any way.

Ecology will enforce all conditions of this Permit for which the State of Washington is authorized, or which are "state-only" provisions (i.e., conditions broader in scope or more stringent than the federal RCRA program). Any challenges of any Permit condition may be appealed in accordance with WAC 173-303-845. In the event that any Permit condition is challenged by any Permittee under WAC 173-303-845, Ecology may stay any such Permit condition as it pertains to all Permittees, in accordance with the same terms of any stay it grants to the challenging Permittee. If such a stay is granted, it will constitute a "stay by the issuing agency" within the meaning of RCW 43.21B.320(1).

This Permit has been developed to allow a step-wise permitting process of the Hanford Facility to ensure the proper implementation of the HFFACO. In order to accomplish this, this Permit consists of six (6) parts.

Part I, Standard Conditions, contains conditions which are similar to those appearing in all dangerous waste permits.

Part II, General Facility Conditions, combines typical dangerous waste permit conditions with those conditions intended to address issues specific to the Hanford Facility. Where appropriate, the general facility conditions apply to all final status dangerous waste management activities at the Facility. Where appropriate, the general facility conditions also address dangerous waste management activities which may not be directly associated with distinct TSD units, or which may be associated with many TSD units (i.e., spill reporting, training, contingency planning, etc.). Part II also includes conditions that address corrective action at solid waste management units and areas of concern.

Part III, Unit-Specific Conditions for Operating Units, contains those Permit requirements that apply to each individual TSD unit operating under final status. Conditions for each TSD unit are found in a chapter dedicated to that TSD unit. These unit-specific chapters contain references to Standard Conditions (Part I) and General Conditions (Part II), as well as additional requirements which are intended to ensure that each TSD unit is operated in an efficient and environmentally protective manner. Additional requirements may also be added when an operating unit ceases operations and undergoes closure.

Part IV, Unit-Specific Conditions for Corrective Action, contains Permit conditions for releases from Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs). For past practice units identified in the HFFACO as either Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Past Practice units (CPP units) or combined Resource Conservation and Recovery Act-Comprehensive Environmental Response, Compensation and Liability Act Past Practice units (R-CPP units), the corrective action conditions are structured around reliance on, the investigation and cleanup requirements established under the HFFACO. For TSD units identified in the HFFACO, the corrective action conditions contemplate use of closure and post-closure processes to satisfy corrective action.

Part V, Unit-Specific Conditions for Units Undergoing Closure, contains those requirements which apply to those specific TSD units, included in this part, that are undergoing closure. In accordance with Section 5.3 of the Action Plan of the HFFACO, all TSD units that undergo closure, irrespective of permit status, will be closed pursuant to the authorized State Dangerous Waste Program in accordance with WAC 173-303-610. Requirements for each TSD unit undergoing closure are found in a chapter dedicated to that TSD unit. These unit-specific chapters contain references to Standard Conditions (Part I) and General Conditions (Part II), as well as additional requirements which are intended to ensure that each TSD unit is closed in an efficient and environmentally protective manner.

Part VI, Unit-Specific Conditions for Units in Post-Closure, contains those requirements which apply to those specific units in this part that have completed modified or landfill closure requirements, and now only need to meet Post-Closure Standards. As set forth in Section 5.3 of the Action Plan of the HFFACO, certain TSD units will be permitted for post-closure care pursuant to the authorized State Dangerous Waste Program (173-303 WAC) and the Hazardous and Solid Waste Amendments. Requirements for each unit undergoing post-closure care are found in a chapter, within this part, dedicated to that unit. These unit specific chapters may contain references to Standard Conditions (Part I) and General Conditions (Part II), as well as the unit specific conditions, all of which are intended to ensure the unit is managed in an efficient, environmentally protective manner.

UNIT STATUS TABLE

Permit Revision	Revision Date	Units Incorporated
Permit Revision 0	8/29/94	616 NDWSF, 305-B Storage Facility, 183-H SEB, 300 ASE, 2727-S, NRDWSF
Permit Revision 1	4/28/95	Simulated High-Level Waste Slurry, 218-E-9 Borrow Pit Demo Site, 200 W Area Ash Pit Demo Site, 2101-M Pond, 216-B-3 Expansion Ponds
Permit Revision 2	8/29/95	Hanford Patrol Academy Demolition Site, 105-DR Large Sodium Fire Facility, 304 Concretion Facility
Permit Revision 3	11/25/96	PUREX Storage Tunnels, 4843 Alkali Metal Storage Facility, 3718-F Alkali Metal Treatment & Storage Facility, 303-K Storage Facility, 300 APT
Permit Revision 4	1/28/98	LERF & 200 Area ETF, 242-A Evaporator, 325 HWTUs
Permit Revision 5	5/18/99	100 D Ponds, 1301-N & 1325-Liquid Waste Disposal Facility, 1324-N Surface Impoundment, 1324-NA Percolation Pond
Permit Revision 6	3/28/00	Permit Condition II.Y, Corrective Action
Permit Revision 7	2/27/01	Waste Treatment & Immobilization Plant, 300 Area WATS
Permit Revision 8	9/23/04	No new units, modification updates
Permit Revision 8A	3/6/06	Integrated Disposal Facility
Permit Revision 8B	1/2007	331-C Storage Unit, PFP Treatment Unit, 241-Z Treatment & Storage Tanks, 303-M Oxide Facility
Permit Revision 8C	8/2007	400 Area Waste Management Unit, 224-T TRUSAF
Permit Revision 8C (8c.2016.2F)	01/21/2016	FS-1 Outdoor Container Storage Area Closure

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
PART III, OPERATING UNITS			
616 Non-Radioactive Dangerous Waste Storage Facility	Rev. 6	Rev. 7	Closed, 9/5/01
242-A Evaporator	Rev. 4		
305-B Storage Facility	Rev. 0		Closed, 7/2/07
325 Hazardous Waste Treatment Units	Rev. 4		RLWT procedural closure, 9/04
LERF & 200 Area ETF	Rev. 4		
PUREX Storage Tunnels	Rev. 3		
Waste Treatment and Immobilization Plant	Rev. 7		Permitted unit under construction
Integrated Disposal Facility	Rev. 8A		

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
331-C Storage Unit	Rev. 8B	Rev. 8C	Closed, 7/22/11
400 Area Waste Management Unit	Rev. 8C		
PART IV, CORRECTIVE ACTION			
100-NR-1 Operable Unit	Rev. 6		
100-NR-2 Operable Unit	Rev. 6	Rev. 8C	Retired, 9/30/09
PART V, UNDERGOING CLOSURE UNITS			
100-D Ponds	Rev. 5	Rev. 6	Closed, 8/9/99
105 DR Large Sodium Fire Facility	Rev. 2	Rev. 6	Closed, 7/1/04
1301-N Liquid Waste Disposal Facility	Rev. 5		
1324-N Surface Impoundment	Rev. 5		
1324-NA Percolation Pond	Rev. 5		
1325-N Liquid Waste Disposal Facility	Rev. 5		
200 West Area Ash Pit Demo Site	Rev. 1	Rev. 6	Closed, 11/28/95
2101-M Pond	Rev. 1	Rev. 6	Closed, 11/28/95
216-B-3 Expansion Ponds	Rev. 1	Rev. 6	Closed, 7/31/95
218-E-8 Borrow Demolition Site	Rev. 1	Rev. 6	Closed, 11/28/95
2727-S Storage Facility	Rev. 0	Rev. 6	Closed, 7/31/95
300 Area Solvent Evaporator	Rev. 0	Rev. 6	Closed, 7/31/95
300 Area Waste Acid Treatment System	Rev. 6	Rev. 8B	Closed, 1/21/05
303-K Storage Facility	Rev. 4	Rev. 6	Closed, 7/22/02
304 Concretion Facility	Rev. 2	Rev. 6	Closed, 1/21/96
311 Tanks (includes 300 Area WATS)	Rev. 6	Rev. 7	Closed, 5/20/02
3718-F Alkali Metal Treatment /Storage	Rev. 3	Rev. 6	Closed, 8/4/98
4843 Alkali Metal Storage Facility	Rev. 3	Rev. 6	Closed, 4/14/97
Hanford Patrol Academy Demo Site	Rev. 2	Rev. 6	Closed, 11/28/95
Simulated High Level Waste Slurry	Rev. 1	Rev. 6	Closed, 9/6/95
PFP Treatment Unit (HA-20MB)	Rev. 8B	Rev. 8B	Closed, 2/8/05
241-Z Treatment and Storage Tanks	Rev. 8B	Rev. 8B	Closed, 2/22/07
303-M Oxide Facility	Rev. 8B	Rev. 8B	Closed, 6/15/06
224-T Transuranic Waste Storage and Assay Facility	Rev. 8C	Rev. 8C	Closed, 11/12/08

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
FS-1 Outdoor Container Storage Area Closure	Rev. 8C		
WESF Hot Cells A through F	Rev. 8C		
PART VI, POSTCLOSURE UNITS			
183-H Solar Evaporation Basin	Rev. 4		
300 Area Process Trenches	Rev. 3		
PROCEDURALLY CLOSED			
216-U-12 Crib	N/A	N/A	Closed, 7/19/07
221-T Test Facility	N/A	N/A	Closed, 2/22/99
2727-WA SRE Sodium Storage Bldg	N/A	N/A	Closed, 2/22/99
324 Pilot Plant	N/A	N/A	Closed, 6/9/97
332 Storage Facility	N/A	N/A	Closed, 4/21/97
437 Maintenance and Storage Facility	N/A	N/A	Closed, 9/11/03
Biological Treatment Test Facilities	N/A	N/A	Closed, 12/10/96
Physical/Chemical Treatment Test Facilities	N/A	N/A	Closed, 5/13/96
Sodium Storage/Sodium Reaction	N/A	N/A	Closed, 9/17/03
Thermal Treatment Test Facilities	N/A	N/A	Closed, 5/13/96
TO BE INCORPORATED			
1706-KE Waste Treatment System			
207-A South Retention Basin			
216-A-29 Ditch			
216-A-36B Crib			
216-A-37-1 Crib			
216-B-3 Main Pond			
216-B-63 Trench			
216-S-10 Pond & Ditch			
222-S Dangerous & Mixed Waste TSD Unit			
241-CX Tank System			

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
600 Area Purgewater Storage and Treatment Facility			
Central Waste Complex			
Contact Handled Transuranic Mixed Waste Packaging and Interim Storage Facility			
DST System/204-AR Waste Unloading Station			
Grout Treatment Facility			
Hexone Storage & Treatment Facility			
IHLW Interim Storage/Canister Storage Building			
Low-Level Burial Grounds			
Nonradioactive Dangerous Waste Landfill			
Single-Shell Tank System			
T Plant Complex			
Waste Encapsulation and Storage Facility			
Waste Receiving and Processing Facility			
TRANSITION UNDER HFFACO ACTION PLAN, SECTION 8 (Will not be incorporated into Permit)			
B Plant Complex			
PUREX Plant			

DEFINITIONS

Except with respect to those terms specifically defined below, all definitions contained in the HFFACO, May 1989, as amended, and in WAC 173-303-040 and other portions of Chapter 173-303 WAC are hereby incorporated, in their entirety, by reference into this Permit. For terms defined in both Chapter 173-303 WAC and the HFFACO, the definitions contained in Chapter 173-303 WAC will control within this Permit. Nonetheless, this Permit is intended to be consistent with the HFFACO.

Where terms are not defined in the regulations, the Permit, or the HFFACO, a standard dictionary reference, or the generally accepted scientific or industrial meaning of the terms will define the meaning associated with such terms.

As used in this Permit, words in the masculine gender also include the feminine and neuter genders, words in the singular include the plural, and words in the plural include the singular.

The following definitions apply throughout this Permit:

The term "**Area of Concern**" means any area of the Facility where a release of dangerous waste or dangerous constituents has occurred, is occurring, is suspected to have occurred, or threatens to occur.

The term "**Contractor(s)**" means, unless specifically identified otherwise in this Permit, or Attachments, Bechtel National, Inc. (BNI), CH2M HILL Plateau Remediation Company, Inc. (CHPRC), Mission Support Alliance, LLC (MSA), Pacific Northwest National Laboratory (PNNL), Washington Closure Hanford, LLC (WCH), and Washington River Protection Solutions, LLC (WRPS).

The term "**Critical Systems**" as applied to determining whether a Permit modification is required, means those specific portions of a TSD unit's structure, or equipment, whose failure could lead to the release of dangerous waste into the environment, and/or systems which include processes which treat, transfer, store, or dispose of regulated wastes. A list identifying the critical systems of a specific TSD unit may be developed and included in Part III, V, and/or VI of this Permit. In developing a critical system list, or in the absence of a critical system list, WAC 173-303-830 Modifications will be considered.

The term "**Dangerous Constituent**" means any constituent identified in WAC 173-303-9905 or 40 CFR Part 264 Appendix IX , any constituent which caused a waste to be listed or designated as dangerous under Chapter 173-303 WAC, and any constituents within the meaning of hazardous substance at RCW 70.105D.020(7).

The term "**Dangerous Waste**" means those solid wastes designated under Chapter 173-303 WAC as dangerous or extremely hazardous waste. As used in the Permit, the phrase "dangerous waste" will refer to the full universe of wastes regulated by Chapter 70.105 RCW and Chapter 173-303 WAC (including dangerous waste, hazardous waste, extremely hazardous waste, mixed waste, and acutely hazardous waste).

The term "**Days**" means calendar days, unless specifically identified otherwise. Any submittal, notification, or recordkeeping requirement that would be due, under the Conditions of this Permit, on a Saturday, Sunday, or federal, or state holiday, will be due on the following business day, unless specifically stated otherwise in the Permit.

The term "**Director**" means the Director of the Washington State Department of Ecology, or a designated representative. The Program Manager of the Nuclear Waste Program (with the address as specified on page one [1] of this Permit) is a duly authorized and designated representative of the Director for purposes of this Permit.

The term "**Ecology**" means the Washington State Department of Ecology (with the address as specified on page one [1] of this Permit).

The term "**Facility**" means all contiguous land, structures, other appurtenances, and improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of dangerous waste. The legal and physical description of the Facility is set forth in Permit Attachment 2.

The term "**Facility**" for the purposes of corrective action under Permit Condition II.Y, means all contiguous property under the control of the Permittees and all property within the meaning of "facility" at RCW 70.105D.020(3) as set forth in Permit Attachment 2.

The term "**HFFACO**" means the Hanford Federal Facility Agreement and Consent Order, as amended (Commonly referred to as Tri-Party Agreement [TPA]).

The term "**Permittees**" means the United States Department of Energy (owner/operator), Bechtel National, Inc. (Co-operator), CH2M HILL Plateau Remediation Company (Co-operator), Mission Support Alliance, LLC (MSA), Pacific Northwest National Laboratory (Co-operator), Washington Closure Hanford, LLC (Co-operator), Washington River Protection Solutions, LLC.

The term "**Permittees**" for purposes of corrective action under Permit Condition II.Y means only the United States Department of Energy (owner/operator).

The term "**Raw Data**" means the initial value of analog or digital instrument output, and/or manually recorded values obtained from measurement tools or personal observation. These values are converted into reportable data (e.g., concentration, percent moisture) via automated procedures and/or manual calculations.

The term "**RCRA Permit**" means the Dangerous Waste Portion of the RCRA Permit for the Treatment, Storage, and Disposal of Dangerous Waste (Dangerous Waste Permit) issued by the Washington State Department of Ecology, pursuant to Chapter 70.105 RCW and Chapter 173-303 WAC, coupled with the HSWA Portion of the RCRA Permit for the Treatment, Storage, and Disposal of Hazardous Waste (HSWA Permit) issued by EPA, Region 10, pursuant to 42 U.S.C. 6901 et seq. and 40 CFR Parts 124 and 270.

The term "**Reasonable Times**" means normal business hours; hours during which production, treatment, storage, construction, disposal, or discharge occurs, or times when Ecology suspects a violation requiring immediate inspection.

The term "**Release**" means any intentional or unintentional spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of dangerous constituents into the environment and includes the abandonment or discarding of barrels, containers, and other receptacles containing dangerous waste or dangerous constituents, and includes any releases within the meaning of release at RCW 70.105D.020(20).

The term "**Significant Discrepancy**" in regard to a manifest or shipping paper, means a discrepancy between the quantity or type of dangerous waste designated on the manifest, or shipping paper, and the quantity or type of dangerous waste a TSD unit actually receives. A significant discrepancy in quantity is a variation greater than ten (10) percent in weight for bulk quantities (e.g., tanker trucks, railroad tank cars, etc.), or any variation in piece count for nonbulk quantities (i.e., any missing container or package would be a significant discrepancy). A significant discrepancy in type is an obvious physical or chemical difference which can be discovered by inspection or waste analysis (e.g., waste solvent substituted for waste acid).

The term "**Solid Waste Management Unit (SWMU)**" means any discernible location at the Facility where solid wastes have been placed at any time, irrespective of whether the location was intended for the management of solid or dangerous waste, and includes any area at the Facility at which solid wastes have been routinely and systematically released (for example through spills), and includes dangerous waste treatment, storage, and disposal units.

The term **"Unit" or "TSD unit"**, as used in Parts I through VI of this Permit, means the contiguous area of land on or in which dangerous waste is placed, or the largest area in which there is a significant likelihood of mixing dangerous waste constituents in the same area. A TSD unit, for purposes of this Permit, is a subgroup of the Facility which has been identified in a Hanford Facility Dangerous Waste Part A Form.

ACRONYMS

ALARA	As Low As Reasonably Achievable
AMSF	Alkali Metal Storage Facility
APDS	Ash Pit Demolition Site
APP	Used to Denote Appendix Page Numbers
APT	Area Process Trenches
ARAR	Applicable, Relevant, and Appropriate Requirements
BNI	Bechtel National, Inc
BPDS	Borrow Pit Demolition Site
CD/RR	Chemical Disposal/Recycle Request
CERCLA	Comprehensive Environmental Response Compensation and Liability Act of 1980 (as Amended by the Superfund Reauthorization Act of 1986)
CFR	Code of Federal Regulations
CHPRC	CH2M HILL Plateau Remediation Company
CIP	Construction Inspection Plan
CLARC	Cleanup Levels and Risk Calculations
CLP	Contract Laboratory Program
COC	Chemical Contaminants of Concern
CPP	CERCLA Past Practice
USDOE-RL	U.S. Department of Energy, Richland Operations Office
USDOE-ORP	U.S. Department of Energy, Office of River Protection
DQO	Data Quality Objective
DSC	Differential Scanning Colorimetry
EC	Emergency Coordinator
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERA	Expedited Response Action
ETF	200 Area Effluent Treatment Facility
HFFACO	Hanford Federal Facility Agreement and Consent Order
GW	Ground Water
HPADS	Hanford Patrol Academy Demolition Site
HSWA	Hazardous and Solid Waste Amendments of 1984
HWMA	Hazardous Waste Management Act
ID	Identification

IRM	Interim Remedial Measure
LDR	Land Disposal Restrictions
LERF	Liquid Effluent Retention Facility
LSFF	105-DR Large Sodium Fire Facility
MSA	Mission Support Alliance, LLC
MTCA	Model Toxics Control Act
OSWER	Office of Solid Waste and Emergency Response
PNNL	Pacific Northwest National Laboratory
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act of 1976
RCW	Revised Code of Washington
ROD	Record of Decision
RPD	Relative Percent Difference
RPP	RCRA Past Practice
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SCD	Security Control Devices
SHLWS	Simulated High Level Waste Slurry
SOP	Standard Operating Procedure
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TSD	Treatment, Storage, and/or Disposal
USDOE	United States Department of Energy
U.S.C.	United States Code
WAC	Washington Administrative Code
WAP	Waste Analysis Plan
WCH	Washington Closure Hanford, LLC
WRPS	Washington River Protection Solutions, LLC
WTP	Waste Treatment and Immobilization Plant
183-H	183-H Solar Evaporation Basins
242-A	242-A Evaporator
300 APT	300 Area Process Trenches

300 ASE	300 Area Solar Evaporator
303-K	303-K Storage Facility
305-B	305-B Storage Facility
325 HWTUs	325 Hazardous Waste Treatment Units
616-NRDWSF	616 Nonradioactive Dangerous Waste Storage Facility

PART I STANDARD CONDITIONS

I.A Effect of Permit

The Permittees are authorized to treat, store, and dispose of dangerous waste in accordance with the Conditions of this Permit and in accordance with the applicable provisions of Chapter 173-303 WAC (including provisions of the Chapter as they have been applied in the HFFACO). Any treatment, storage, or disposal of dangerous waste by the Permittees at the Facility that is not authorized by this Permit, or by WAC 173-303-400 (including provisions of this regulation as they have been applied in the HFFACO), for those TSD units not subject to this Permit, and for which a Permit is required by Chapter 173-303 WAC, is prohibited.

TSD units operating or closing under interim status will maintain interim status until that TSD unit is incorporated into Part III, V, and/or VI of this Permit, or until interim status is terminated under WAC 173-303-805(8). Interim status units will be incorporated into this Permit through the Permit modification process.

The Conditions of this Permit will be applied to the Facility as defined by the Permit Applicability Matrix (Permit Attachment 9).

I.A.1 USDOE is responsible for activities which include, but are not limited to, the overall management and operation of the Facility.

BNI is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

CHPRC is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

MSA is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

PNNL is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

WCH is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

WRPS is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

I.A.2 Coordination with the HFFACO

Each TSD unit will have an application for a final status Permit or closure/post-closure plan submitted to Ecology in accordance with the schedules identified in the HFFACO Milestone M-20-00 or in accordance with WAC 173-303-830. After completion of the Permit application or closure/post-closure plan review, a final Permit decision will be made pursuant to WAC 173-303-840. Specific Conditions for each TSD unit will be incorporated into this Permit in accordance with the Class 3 Permit modification procedure identified in Permit Condition I.C.3.

I.B Personal and Property Rights

This Permit does not convey property rights of any sort, or any exclusive privilege; nor does it authorize any injury to persons or property, or any invasion of other private rights, or any violation of federal, state, or local laws or regulations.

I.C Permit Actions

I.C.1 Modification, Revocation, Reissuance, or Termination

This Permit may be modified, revoked and reissued, or terminated by Ecology for cause per WAC 173-303-810(7) as specified in WAC 173-303-830(3), (4), and (5).

I.C.2 Filing of a Request

The filing of a request for a Permit modification, or revocation and reissuance, or termination, or a notification of planned changes, or anticipated noncompliance on the part of the Permittees, will not stay any Permit condition [WAC 173-303-810(7)] except as provided in WAC 173-303-810(2) under an emergency permit.

I.C.3 Modifications

I.C.3.a Except as provided otherwise by specific language in this Permit, the Permit modification procedures of WAC 173-303-830(2), (3), and (4) will apply to modifications or changes in design or operation of the Facility, or any modification or change in dangerous waste management practices covered by this Permit.

I.C.3.b As an exception, the Permittees will provide notifications to Ecology required by WAC 173-303-830(4)(a)(i)(A) on a quarterly basis. Each quarterly notification will be submitted within ten (10) days of the end of the quarter, and provide the required information for all such modification s put into effect during that reporting period.

I.C.3.c Quarterly reporting periods will be based upon the state Fiscal Year. For notifications required by the Permittees to persons on the facility mailing list described in WAC 173-303-830(4)(a)(i)(B), -830(4)(b)(ii), -830(4)(c)(ii), and -830(4)(e)(ii)(C), use of appropriate HFFACO Community Relations Plan publications and/or list servers for public involvement satisfy the notification requirements.

I.D Severability

I.D.1 Effect of Invalidation

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance is contested and/or held invalid, the application of such provision to other circumstances and the remainder of this Permit will not be affected thereby. Invalidation of any state statutory or regulatory provision which forms the basis for any Condition of this Permit does not affect the validity of any other state statutory or regulatory basis for said Condition.

I.D.2 Final Resolution

In the event that a Condition of this Permit is stayed for any reason, the Permittees will continue to comply with the related applicable and relevant interim status standards in WAC 173-303-400 until final resolution of the stayed Condition, unless Ecology determines compliance with the related applicable and relevant interim status standards would be technologically incompatible with compliance with other Conditions of this Permit, which have not been stayed, or unless the HFFACO authorizes an alternative action, in which case the Permittees will comply with the HFFACO.

I.E Duties and Requirements

I.E.1 Duty to Comply

The Permittees will comply with all Conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an emergency Permit issued under WAC 173-303-804. Any Permit noncompliance other than noncompliance authorized by an emergency Permit constitutes a violation of Chapter 70.105 RCW, as amended, and is grounds for enforcement action, Permit termination, modification or revocation and reissuance of the Permit, and/or denial of a Permit renewal application.

I.E.2 Compliance Not Constituting Defense

Compliance with the terms of this Permit does not constitute a defense to any order issued or any action brought under Section 3007, 3008, 3013, or 7003 of RCRA (42 U.S.C. Sections 6927, 6928, 6934, and 6973), Section 104, 106(a) or 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) [42 U.S.C. Sections 9604, 9606(a), and 9607], as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 9601 et seq.), or any other federal, state, or local law governing protection of public health, or the environment; provided, however, that compliance with this Permit during its term constitutes compliance at those areas subject to this Permit for the purpose of enforcement with WAC 173-303-140, WAC 173-303-180, WAC 173-303-280 through -395, WAC 173-303-600 through -680, WAC 173-303-810, and WAC 173-303-830, except for Permit modification s and those requirements not included in the Permit that become effective by statute, or that are promulgated under 40 CFR Part 268 restricting the placement of dangerous waste in or on the land.

I.E.3 Duty to Reapply

If the Permittees wish to continue an activity regulated by this Permit after the expiration date of this Permit, the Permittees must apply for, and obtain a new Permit, in accordance with WAC 173-303-806(6).

I.E.4 Permit Expiration and Continuation

This Permit, and all Conditions herein, will remain in effect beyond the Permit's expiration date until the effective date of the new Permit, if the Permittees have submitted a timely, complete application for renewal per WAC 173-303-806 and, through no fault of the Permittees, Ecology has not made a final Permit determination as set forth in WAC 173-303-840.

I.E.5 Need to Halt or Reduce Activity Not a Defense

It will not be a defense in the case of an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the Conditions of this Permit.

I.E.6 Duty to Mitigate

In the event of noncompliance with the Permit, the Permittees will take all reasonable steps to minimize releases to the environment, and will carry out such measures as are reasonable to minimize or correct adverse impacts on human health and the environment.

I.E.7 Proper Operation and Maintenance

The Permittees will at all times properly operate and maintain all facilities and systems of treatment and control, which are installed or used by the Permittees, to achieve compliance with the Conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of backup or auxiliary facilities, or similar systems only when necessary to achieve compliance with the Conditions of the Permit.

I.E.8 Duty to Provide Information

The Permittees will furnish to Ecology, within a reasonable time, any relevant information which Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittees will also furnish to Ecology, upon request, copies of records required to be kept by this Permit.

I.E.9 Inspection and Entry

The Permittees will allow Ecology, or authorized representatives, upon the presentation of Ecology credentials, to:

I.E.9.a During operating hours, and at all other reasonable times, enter and inspect the Facility or any unit or area within the Facility, where regulated activities are located or conducted, or where records must be kept under the Conditions of this Permit;

I.E.9.b Have access to, and copy, at reasonable times, any records that must be kept under the Conditions of this Permit;

I.E.9.c Inspect at reasonable times any portion of the Facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and,

I.E.9.d Sample or monitor, at reasonable times, for the purposes of assuring Permit compliance, or as otherwise authorized by state law, as amended, for substances or parameters at any location.

I.E.10 Monitoring and Records

I.E.10.a Samples and measurements taken by the Permittees for the purpose of monitoring required by this Permit will be representative of the monitored activity. Sampling methods will be in accordance with WAC 173-303-110 or 40 CFR 261, unless otherwise specified in this Permit, or agreed to in writing by Ecology. Analytical methods will be as specified in the most recently published test procedure of the documents cited in WAC 173-303-110(3)(a) through (h), unless otherwise specified in this Permit, or agreed to in writing by Ecology.

I.E.10.b The Permittees will retain at the TSD unit(s), or other locations approved by Ecology, as specified in Parts III, V, and/or VI of this Permit, records of monitoring information required for compliance with this Permit, including calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of reports and records required by this Permit, and records of data used to complete the application for this Permit for a period of at least ten (10) years from the date of the sample, measurement, report, or application, unless otherwise required for certain information by other Conditions of this Permit. This information may be retained on electronic media.

I.E.10.c The Permittees will retain at the Facility, or other approved location, records of all monitoring and maintenance records, copies of all reports and records required by this Permit, and records of all data used to complete the application for this Permit, which are not associated with a particular TSD unit, for a period of at least ten (10) years from the date of certification of completion of post-closure care, or corrective action for the Facility, whichever is later. This information may be retained on electronic media.

I.E.10.d The record retention period may be extended by request of Ecology at any time by notification, in writing, to the Permittees, and is automatically extended during the course of any unresolved enforcement action regarding this Facility to ten (10) years beyond the conclusion of the enforcement action.

I.E.10.e Records of monitoring information shall include:

I.E.10.e.i The date, exact place and time of sampling or measurements;

I.E.10.e.ii The individual who performed the sampling or measurements and their affiliation;

I.E.10.e.iii The dates the analyses were performed;

I.E.10.e.iv The individual(s) who performed the analyses and their affiliation;

I.E.10.e.v The analytical techniques or methods used; and,

I.E.10.e.vi The results of such analyses

I.E.11 Reporting Planned Changes

The Permittees will give notice to Ecology, as soon as possible, of any planned physical alterations, or additions to the Facility subject to this Permit. Such notice does not authorize any noncompliance with, or modification of, this Permit.

I.E.12 Certification of Construction or Modification

I.E.12.a The Permittees may not commence treatment, storage, or disposal of dangerous wastes in a new or modified portion of TSD units subject to this Permit until:

I.E.12.b The Permittees have submitted to Ecology, by certified mail, overnight express mail, or hand delivery, a letter signed by the Permittees, and a registered professional engineer, stating that the TSD unit has been constructed or modified in compliance with the Conditions of this Permit; and,

I.E.12.c Ecology has inspected the modified or newly constructed TSD unit, and finds that it is in compliance with the Conditions of this Permit; or

I.E.12.d Within fifteen (15) days of the date of receipt of the Permittees' letter, the Permittees have not received notice from Ecology of its intent to inspect, prior inspection is waived, and the Permittees may commence treatment, storage, and disposal of dangerous waste.

I.E.13 Anticipated Noncompliance

The Permittees will give at least thirty (30) days advance notice to Ecology of any planned changes in the Facility subject to this Permit, or planned activity which might result in noncompliance with Permit requirements.

If thirty (30) days advance notice is not possible, then the Permittees will give notice immediately after the Permittees become aware of the anticipated noncompliance. Such notice does not authorize any noncompliance with, or modification of, this Permit.

I.E.14 Transfer of Permits

I.E.14.a This Permit may be transferred to a new owner/operator only if it is modified, or revoked and reissued, pursuant to WAC 173-303-830(3)(b). Unit-specific portion may be transferred to a new Co-operator as a Class [1]1 modification with prior approval of the Department's director.

I.E.14.b Before transferring ownership or operation of the Facility during its operating life, the owner/operator will notify the new owner/operator in writing, of the requirements of WAC 173-303-290(2), -600 and -806, and this Permit.

I.E.15 Immediate Reporting

I.E.15.a The Permittees will verbally report to Ecology any release of dangerous waste or hazardous substances, or any noncompliance with the Permit which may endanger human health or the environment. Any such information will be reported immediately after the Permittees become aware of the circumstances.

I.E.15.b The immediate verbal report will contain all the information needed to determine the nature and extent of any threat to human health and the environment, including the following:

I.E.15.b.i Name, address, and telephone number of the Permittee responsible for the release or noncompliant activity;

I.E.15.b.ii Name, location, and telephone number of the unit at which the release occurred;

I.E.15.b.iii Date, time, and type of incident;

I.E.15.b.iv Name and quantity of material(s) involved;

I.E.15.b.v The extent of injuries, if any;

I.E.15.b.vi An assessment of actual or potential hazard to the environment and human health, where this is applicable;

I.E.15.b.vii Estimated quantity of released material that resulted from the incident; and,

I.E.15.b.viii Actions which have been undertaken to mitigate the occurrence.

I.E.15.c The Permittees will report, in accordance with Permit Conditions I.E.15.a and I.E.15.b, any information concerning the release, or unpermitted discharge, of any dangerous waste or hazardous substances that may cause an endangerment to drinking water supplies, or ground or surface waters, or of a release, or discharge of dangerous waste, or hazardous substances, or of a fire or explosion at the Facility, which may threaten human health or the environment. The description of the occurrence and its cause will include all information necessary to fully evaluate the situation and to develop an appropriate course of action.

I.E.15.d For any release or noncompliance not required to be reported to Ecology immediately, a brief account must be entered within two (2) working days, into the TSD Operating Record, for a TSD unit, or into the Facility Operating Record, inspection log, or separate spill log, for non-TSD units. This account must include: the time and date of the release, the location and cause of the release, the type and quantity of material released, and a brief description of any response actions taken or planned.

I.E.15.e All releases, regardless of location of release, or quantity of release, will be controlled and mitigated, if necessary, as required by WAC 173-303-145(3).

I.E.16 Written Reporting

Within fifteen (15) days after the time the Permittees become aware of the circumstances of any noncompliance with this Permit, which may endanger human health or the environment, the Permittees will provide to Ecology a written report. The written report will contain a description of the noncompliance and its cause (including the information provided in the verbal notification); the period of noncompliance including exact dates and times; the anticipated time noncompliance is expected to continue, if the noncompliance has not been corrected; corrective measures being undertaken to mitigate the situation, and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

I.E.17 Manifest Discrepancy Report

I.E.17.a For dangerous waste received from outside the Facility, whenever a significant discrepancy in a manifest is discovered, the Permittees will attempt to reconcile the discrepancy. If not reconciled within fifteen (15) days of discovery, the Permittees will submit a letter report in accordance with WAC 173-303-370(4), including a copy of the applicable manifest or shipping paper, to Ecology.

I.E.17.b For dangerous waste which is being transported within the Facility (i.e., shipment of on-site generated dangerous waste), whenever a significant discrepancy in the shipping papers (see Permit Condition II.Q.1) is discovered, the Permittees will attempt to reconcile the discrepancy. If not reconciled within fifteen (15) days of discovery, the Permittees will note the discrepancy in the receiving unit's Operating Record.

I.E.18 Unmanifested Waste Report

The Permittees will follow the provisions of WAC 173-303-370 for the receipt of any dangerous waste shipment from off-site. The Permittees will also submit a report in accordance with WAC 173-303-390(1) to Ecology within fifteen (15) days of receipt of any unmanifested dangerous waste shipment received from off-site sources.

I.E.19 Other Noncompliance

The Permittees will report to Ecology all instances of noncompliance, not otherwise required to be reported elsewhere in this Permit, at the time the Annual Dangerous Waste Report is submitted.

I.E.20 Other Information

Whenever the Permittees become aware that they have failed to submit any relevant facts in a Permit application, closure plan, or post-closure plan, or submitted incorrect information in a Permit application, closure plan, or post-closure plan, or in any report to Ecology, the Permittees will promptly submit such facts or corrected information.

I.E.21 Reports, Notifications, and Submissions

All written reports, notifications or other submissions, which are required by this Permit to be sent, or given to the Director or Ecology, should be sent certified mail, overnight express mail, or hand delivered, to the current address and telephone number shown below. This address and telephone number may be subject to change.

Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Blvd
Richland, Washington 99354
Telephone: (509) 372-7950

Telephonic and oral reports/notifications also need to be provided to Ecology's Richland Office.

Ecology will give the Permittees written notice of a change in address or telephone number. It is the responsibility of the Permittees to ensure any required reports, notifications, or other submissions are transmitted to the addressee listed in this Condition. However, the Permittees will not be responsible for ensuring verbal and written correspondence reaches a new address or telephone number until after their receipt of Ecology's written notification.

I.E.22 Annual Report

The Permittees will comply with the annual reporting requirements of WAC 173-303-390(2)(a) through (e), and (g).

I.F Signatory Requirement

All applications, reports, or information submitted to Ecology, which require certification, will be signed and certified in accordance with WAC 173-303-810(12) and (13). All other reports required by this Permit and other information requested by Ecology will be signed in accordance with WAC 173-303-810(12).

I.G Confidential Information

The Permittees may declare as confidential any information required to be submitted by this Permit, at the time of submission, in accordance with WAC 173-303-810(15).

I.H Documents to be Maintained at Facility Site

The Permittees will maintain at the Facility, or some other location approved by Ecology, the following documents and amendments, revisions, and modifications to these documents: (1) This Permit and all Attachments; and (2) The Hanford Facility Operating Record.

All dangerous waste Part B permit applications, post closure permit applications, and closure plan applications are maintained in the Administrative Record located at 2440 Stevens, Room 1101, Richland, WA.

Other approved locations: (1) 700 Area, (2) Locations within the City of Richland under control of one or more of the Permittees, (3) Administrative Record locations within the Stevens Center complex, (4) Consolidated Information Center at Washington State University, Tri-Cities. (5) Archived records at the National Archives and Records Administration (NARA), Pacific Alaska Region, 6125 Sand Point Way NE, Seattle, Washington, 98115-7999.

These documents will be maintained for ten (10) years after post-closure care or corrective action for the Facility, whichever is later, has been completed and certified as complete.

PART II GENERAL FACILITY CONDITIONS

II.A Facility Contingency Plan

II.A.1 The Permittees will immediately carry out applicable provisions of the *Hanford Emergency Management Plan* as provided in Permit Attachment 4, pursuant to WAC 173-303-360(2), whenever there is an incident meeting the criteria of Permit Attachment 4, Section 4.2. Enforceable portions of Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) are identified in Permit Attachment 4, Appendix A.

II.A.2 The Permittees will comply with the requirements of WAC 173-303-350(4), as provided in the *Hanford Emergency Management Plan* (Permit Attachment 4). The *Hanford Emergency Management Plan* provides reference to the need for unit-specific contingency documentation. Unit-specific contingency documentation for Part III TSD units is included in Part III of this Permit. Unit-specific contingency documentation for Part V and VI TSD units required by this Permit condition is maintained in the Hanford Facility Operating Record, Unit-Specific files.

II.A.3 The *Permittees* will review and amend, if necessary, the applicable portions of the *Hanford Emergency Management Plan*, as provided in Permit Attachment 4, pursuant to WAC 173-303-350(5), and in accordance with the provisions of WAC 173-303-830(4). The Permittees will be able to demonstrate how Amendments to the applicable portions are controlled. The plan will be amended within a period of time agreed upon by Ecology.

II.A.4 The Permittees will comply with the requirements of WAC 173-303-350(3) and –360(1) concerning the emergency coordinator, except the names and home telephone numbers will be on file with the single point-of-contact, phone number (509) 373-3800 or 375-2400 (for PNNL units) as described in the *Hanford Emergency Management Plan.*

II.B Preparedness and Prevention

II.B.1 The Permittees will equip the Facility with the equipment specified in WAC 173-303-340(1) as specified in the *Hanford Emergency Management Plan* (Permit Attachment 4). Unit-specific preparedness and prevention provisions are included in Parts III, V, and/or VI of this Permit.

II.B.2 The Permittees will test and maintain the equipment specified in Permit Condition II.B.1 as necessary to assure proper operation in the event of emergency.

II.B.3 The Permittees will maintain access to communications or alarms pursuant to WAC 173-303-340(2), as provided in the *Hanford Emergency Management Plan* (Permit Attachment 4) and unit-specific contingency plans.

II.B.4 The Permittees will comply with WAC 173-303-340(4) and WAC 173-303-355(1) pertaining to arrangements with local authorities.

II.B.5 Based on the arrangements with local authorities required by WAC 173-303-340(4) documented in Permit Attachment 4, Table 3-1, the Permittees will maintain the Memorandums of Understanding to comply with WAC 173-303-350(4)(b). The Hanford Facility Memorandums of Understanding with local authorities provides emergency planning and coordination equivalent to submittal of the contingency plan to local authorities

II.C Personnel Training

II.C.1 The Permittees will conduct personnel training as required by WAC 173-303-330. The Permittees will maintain documents in accordance with WAC 173-303-330(2) and (3). Training records may be maintained in the Hanford Facility Operating Record, or on electronic data storage.

II.C.2 All Hanford Facility personnel will receive general Facility training within six (6) months of hire. This training will provide personnel with orientation of dangerous waste management activities being conducted at the Hanford Facility. This training will include:

II.C.2.a Description of emergency signals and appropriate personnel response;

II.C.2.b Identification of contacts for information regarding dangerous waste management activities;

II.C.2.c Introduction to waste minimization concepts;

II.C.2.d Identification of contact(s) for emergencies involving dangerous waste; and

II.C.2.e Familiarization with the applicable portions of the *Hanford Emergency Management Plan.*

II.C.3 Description of training plans for personnel assigned to TSD units subject to this Permit are delineated in the unit-specific Chapters in Parts III, V, and/or VI of this Permit.

II.C.4 The Permittees will provide the necessary training to non-Facility personnel (i.e., visitors, sub-contractors), as appropriate, for the locations of such personnel, and the activities that will be undertaken. At a minimum, this training will describe dangerous waste management hazards at the Facility.

II.D Waste Analysis

II.D.1 All waste analyses required by this Permit will be conducted in accordance with a written waste analysis plan (WAP), or sampling and analysis plan (SAP). Operating TSD units will have a WAP, which will be approved through incorporation of the TSD unit into Part III of this Permit. Closing TSD units, and units in post-closure, should have a SAP and, if necessary, a WAP, which will be approved through incorporation of the TSD unit into Part V and/or VI of this Permit.

II.D.2 Until a WAP is implemented in accordance with Permit Condition II.D.1., any unit(s) identified in Parts III, V, and/or VI of this Permit, without a unit-specific WAP approved by Ecology, will not treat, store, or dispose of dangerous waste, unless specified otherwise by Ecology in writing.

II.D.3 Each TSD unit WAP will include:

II.D.3.a The parameters for which each dangerous waste will be analyzed, and the rationale for selecting these parameters; (i.e., how analysis for these parameters will provide sufficient information on the waste properties to comply with WAC 173-303-300(1), (2), (3), and (4);

II.D.3.b The methods of obtaining or testing for these parameters;

II.D.3.c The methods for obtaining representative samples of wastes for analysis (representative sampling methods are discussed in WAC 173-303-110(2);

II.D.3.d The frequency with which analysis of a waste will be reviewed, or repeated, to ensure that the analysis is accurate and current;

II.D.3.e The waste analyses which generators have agreed to supply;

II.D.3.f Where applicable, the methods for meeting the additional waste analysis requirements for specific waste management methods, as specified in WAC 173-303-140(4)(b), 173-303-395(1), 173-303-630 through 173-303-670, and 40 CFR 264.1034, 264.1063, 284(a), and 268.7, for final status facilities;

II.D.3.f.i For off-site facilities, the procedures for confirming that each dangerous waste received matches the identity of the waste specified on the accompanying manifest, or shipping paper. This includes at least:

II.D.3.f.i.a The procedure for identifying each waste movement at the Facility; and,

II.D.3.f.i.b The method for obtaining a representative sample of the waste to be identified, if the identification method includes sampling.

II.D.3.f.ii For surface impoundments exempted from Land Disposal Restrictions (LDR) under 40 CFR 268.4(a), incorporated by reference in WAC 173-303-140(2), the procedures and schedules for:

II.D.3.f.iii The sampling of impoundment contents;

II.D.3.f.iv The analysis of test data; and

II.D.3.f.v The annual removal of residues that are not delisted under 40 CFR 260.22, or which exhibit a characteristic of hazardous waste and either;

II.D.3.f.v.a Do not meet applicable treatment standards of 40 CFR Part 268, Subpart D; or

II.D.3.f.v.b Where no treatment standards have been established:

II.D.3.f.v.b.1 Such residues are prohibited from land disposal under 40 CFR 268.32, or RCRA Section 3004(d); or

II.D.3.f.v.b.2 Such residues are prohibited from land disposal under 40 CFR 268.33(f); and

II.D.4 Should waste analysis be required by this Permit at a location on the Facility, other than at a TSD unit, a SAP will be maintained by the Permittees, and made available upon request from Ecology. Any SAP required by this Permit, not associated with a particular TSD unit, will include the elements of Permit Conditions II.D.3.a.

II.E Quality Assurance/Quality Control

II.E.1 All WAPs and SAPs required by this Permit will include a quality assurance/quality control (QA/QC) plan, or equivalent, to document all monitoring procedures to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented in accordance with HFFACO Action Plan §6.5, Quality Assurance, and reported/made available in accordance with HFFACO Action Plan §9.6, Data Access and Delivery Requirements.

II.E.2 The level of QA/QC for the collection, preservation, transportation, and analysis of each sample required for implementation of this Permit may be based upon an Ecology-approved DQO for the sample. These DQOs will be approved by Ecology in writing or through incorporation of unit plans and Permits into Parts III, V, and/or VI of this Permit.

II.F Ground Water and Vadose Zone Monitoring

The Permittees will comply with the ground water monitoring requirements of WAC 173-303-645. This Condition will apply only to those wells the Permittees use for the ground water monitoring programs applicable to the TSD units incorporated into Parts III, V, and/or VI of this Permit. Where releases from TSD units subject to this Permit have been documented or confirmed by investigation, or where vadose zone monitoring is proposed for integration with ground water monitoring, the Permittees will evaluate the applicability of vadose zone monitoring. The Permittees will consult with Ecology regarding the implementation of these requirements. If agreed to by Ecology, integration of ground water and vadose zone monitoring, for reasons other than this Permit, may be accommodated by this Permit. Results from other investigation activities will be used whenever possible to supplement and/or replace sampling required by this Permit.

II.F.1 Purgewater Management

Purgewater will be handled in accordance with the requirements set forth in permit Attachment 10, *Purgewater Management Plan.*

II.F.2 Well Inspection and Maintenance

II.F.2.a The Permittees will inspect the integrity of active resource protection wells as defined by WAC 173-160-410(13), subject to this Permit, at least once every five (5) years as specified in the *Hanford Well Maintenance Inspection Plan* (Permit Attachment 8). These inspections will be recorded in the Operating Record.

II.F.2.b The Permittees will evaluate resource protection wells subject to this Permit according to the *Hanford Well Maintenance Inspection Plan* (Permit Attachment 8) and the *Policy on Remediation of Existing Wells and Acceptance Criteria for RCRA and CERCLA*, June 1990 (Permit Attachment 7). The Permittees will submit a permit modification request to Ecology to decommission or maintain wells as necessary to ensure compliance with WAC 173-303-645(8)(c). This permit modification request will include a schedule of compliance, which may incorporate by reference applicable schedule(s) in HFFACO Milestone M-24. For Wells to be decommissioned, this permit modification must also include a request for installation of replacement wells, if necessary, to ensure compliance with WAC 173-303-645 requirements.

II.F.2.c Ecology will receive a notice of intent (NOI) in writing at least seventy-two (72) hours before the Permittees decommission (excluding maintenance activities) any well subject to this Permit.

II.F.2.d For wells subject to this Permit, the Permittees will achieve full compliance with Chapter 173-160 WAC and Chapter 18.104 RCW by replacing non-compliant wells subject to the permit with new wells under the schedule in HFFACO Milestone M-24, as amended, incorporated by reference into this Permit.

II.F.3 Well Construction

All wells constructed pursuant to this Permit will be constructed in compliance with Chapter 173-160 WAC.

II.F.4 Annual Groundwater Report Due Date

The due date for the annual groundwater monitoring data (report) required in WAC 173-303-390, is changed from March 1 to July 31 of each year.

II.G **Siting Criteria**

The Permittees will comply with the applicable notice of intent and siting criteria of WAC 173-303-281 and WAC 173-303-282, respectively.

II.H **Recordkeeping and Reporting**

The provisions of WAC 173-303-620 are not applicable to the Hanford Facility because the USDOE is both owner and operator of the Hanford Facility. WAC 173-303-620(1)(c).

II.I **Facility Operating Record**

II.I.1 The Permittees will maintain a written Facility Operating Record until ten (10) years after post-closure, or corrective action is complete and certified for the Facility, whichever is later. Except as specifically provided otherwise in this Permit, the Permittees will also record all information referenced in this Permit in the Facility Operating Record within seven (7) working days after the information becomes available. A TSD unit-specific Operating Record will be maintained for each TSD unit at a location identified in Parts III, V, and VI of this Permit. This information may be maintained on electronic media. Each TSD unit-specific Operating Record will be included by reference in the Facility Operating Record. Information required in each TSD unit-specific Operating Record is identified on a unit-by-unit basis in Part III, V, or VI of this Permit. The Facility Operating Record will include, but not be limited to, the following information.

II.I.1.a A description of the system(s) currently utilized to identify and map solid waste management units and their locations. The description of the system(s) is required to include an identification of on-site access to the system's data, and an on-site contact name and telephone number. In addition to, or as part of, this system(s), the Permittees will also maintain a list identifying active ninety (90)-day waste storage areas, and dangerous waste satellite accumulation areas and their locations. The list will identify the location, the predominant waste types managed at the area, and a date identifying when the list was compiled. Maps will be provided by the Permittees upon request by Ecology;

II.I.1.b Records and results of waste analyses required by WAC 173-303-300;

II.I.1.c An identification of the system(s) currently utilized to generate Occurrence Reports. The identification of the system(s) is required to include a description, an identification of an on-site location of hard-copy Occurrence Reports, an identification of on-site access to the system's data, and an on-site contact name and telephone number;

II.I.1.d Copies of all unmanifested waste reports;

II.I.1.e The *Hanford Emergency Management Plan*, as well as summary reports, and details of all incidents that require implementing the contingency plan, as specified in WAC 173-303-360(2)(k);

II.I.1.f An identification of the system(s) currently utilized and being developed to record personnel training records and to develop training plans. The identification of the system(s) is required to include a description, an identification of on-site access to the system's data, and an on-site contact name and telephone number;

II.I.1.g Preparedness and prevention arrangements made pursuant to WAC 173-303-340(4) and documentation of refusal by state or local authorities that have declined to enter into agreements in accordance with WAC 173-303-340(5);

II.I.1.h Reserved Condition;

II.I.1.i Reserved Condition;

II.I.1.j Documentation (e.g., waste profile sheets) of all dangerous waste transported to or from any TSD unit subject to this Permit. This documentation will be maintained in the receiving unit's Operating Record from the time the waste is received;

II.I.1.k An identification of the system(s) currently utilized to cross-reference waste locations to specific manifest document numbers. The identification of the system(s) is required to include a thorough description, an identification of an on-site location of a hard-copy data report, an identification of on-site access to the system's data, and an on-site contact name and telephone number;

II.I.1.l Reserved Condition;

II.I.1.m Annual Reports required by this Permit;

II.I.1.n An identification of all systems currently utilized to record monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation. The identification of systems will include a description of the systems. The descriptions will include a confirmation that the criteria of Permit Condition I.E.10 is provided by the utilization of the system. The identification of the systems will also include an identification of on-site access to the system's data, an on-site contact name and telephone number;

II.I.1.o Reserved Condition;

II.I.1.p Summaries of all records of ground water corrective action required by WAC 173-303-645;

II.I.1.q An identification of the system(s) currently being utilized and being developed to evaluate compliance with the Conditions of this Permit and with Chapter 173-303 WAC. The identification of the system(s) will include a description of the system(s), an identification of on-site access to the system's data, and an on-site contact name and telephone number. The description of the system(s) will also include a definition of which portion(s) of the system(s) is accessible to Ecology;

II.I.1.r All deed notifications required by this Permit (to be included by reference);

II.I.1.s All inspection reports required by this Permit; and

II.I.1.t All other reports as required by this Permit, including design change documentation and nonconformance documentation.

II.J Facility Closure

II.J.1 Final closure of the Hanford Facility will be achieved when closure activities for all TSD units have been completed, as specified in Parts III, IV, V, or VI of this Permit. Completion of these activities will be documented using either certifications of closure, in accordance with WAC 173-303-610(6), or certifications of completion of post-closure care, in accordance with WAC 173-303-610(11).

II.J.2 The Permittees will close all TSD units as specified in Parts III, V, and/or VI of this Permit.

II.J.3 The Permittees will submit a written notification of, or request for, a Permit modification in accordance with the provisions of WAC 173-303-610(3)(b), whenever there is a change in operating plans, facility design, or the approved closure plan. The written notification or request must include a copy of the amended closure plan for review, or approval, by Ecology.

II.J.4 The Permittees will close the Facility in a manner that:

II.J.4.a Minimizes the need for further maintenance;

II.J.4.b Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, or dangerous waste decomposition products, to the ground, surface water, ground water, or the atmosphere; and

II.J.4.c Returns the land to the appearance and use of surrounding land areas to the degree possible, given the nature of the previous dangerous waste activity.

II.J.4.d Meets the requirements of WAC 173-303-610(2)(b).

II.K Soil/Ground Water Closure Performance Standards

II.K.1 For purposes of Permit Condition II.K, the term "clean closure" shall mean the status of a TSD unit at the Facility which has been closed to the cleanup levels prescribed by WAC 173-303-610(2)(b), provided certification of such closure has been accepted by Ecology.

II.K.2 The Permittees may close a TSD unit to background levels as defined in Ecology approved Hanford Site Background Documents, if background concentrations exceed the levels prescribed by Permit Condition II.K.1. Closure to these levels, provided the Permittees comply with all other closure requirements for a TSD unit as identified in Parts III, V, and/or VI of this Permit, shall be deemed as "clean closure".

II.K.3 Except for those TSD units identified in Permit Conditions II.K.1, II.K.2, or II.K.4, the Permittees may close a TSD unit to a cleanup level specified under Method C of Chapter 173-340 WAC. Closure of a TSD unit to these levels, provided the Permittees comply with all other closure requirements for the TSD unit as specified in Parts III, V, and/or VI of the Permit, and provided the Permittees comply with Permit Conditions II.K.3.a through II.K.3.c, shall be deemed as a "modified closure".

II.K.3.a For "modified closures", the Permittees shall provide institutional controls in accordance with WAC 173-340-440 which restricts access to the TSD unit for a minimum of five (5) years following completion of closure. The specific details and duration of institutional controls shall be specified in Parts III, V, and/or VI of this Permit for a particular TSD unit.

II.K.3.b For "modified closures", the Permittees shall provide periodic assessments of the TSD unit to determine the effectiveness of the closure. The specific details of the periodic assessments shall be specified in Parts III, V, and/or VI of this Permit. The periodic assessments shall include, as a minimum, a compliance monitoring plan in accordance with WAC 173-340-410 that will address the assessment requirements on a unit-by-unit basis. At least one (1) assessment activity shall take place after a period of five (5) years from the completion of closure, which will demonstrate whether the soils and ground water have been maintained at or below the allowed concentrations as specified in Parts III, V, or VI of this Permit. Should the required assessment activities identify contamination above the allowable limits as specified in Parts III, V, and/or VI, the TSD unit must be further remediated, or the requirements of II.K.4 must be followed. Should the required assessment activities demonstrate that contamination has diminished, or remained the same, the Permittees may request that Ecology reduce, or eliminate the assessment activities and/or institutional controls.

II.K.3.c For "modified closures", the Permittees shall specify the particular activities required by this Condition in a Post-Closure Permit application.

II.K.4 Any TSD unit for which Permit Conditions II.K.1, II.K.2, or II.K.3, are not chosen as the closure option, closing the TSD unit as a landfill may be selected. Closure and post-closure of the TSD unit as a landfill, must follow the procedures and requirements specified in WAC 173-303-610.

II.K.5 The cleanup option selected shall be specified in Parts III, V, and/or VI of this Permit, and shall be chosen with consideration of the potential future site use for that TSD unit/area. Definitions contained within Chapter 173-340 WAC shall apply to Permit Condition II.K. Where definitions are not otherwise provided by this Permit, the HFFACO, or Chapter 173-303 WAC.

II.K.6 Deviations from a TSD unit closure plan required by unforeseen circumstances encountered during closure activities, which do not impact the overall closure strategy, but provide equivalent results, shall be documented in the TSD unit-specific Operating Record and made available to Ecology upon request, or during the course of an inspection.

II.K.7 Where agreed to by Ecology, integration of other statutorily or regulatory mandated cleanups may be accommodated by this Permit. Results from other cleanup investigation activities shall be used whenever possible to supplement and/or replace TSD unit closure investigation activities. All, or appropriate parts of, multipurpose cleanup and closure documents can be incorporated into this Permit through the Permit modification process. Cleanup and closures conducted under any statutory authority, with oversight by either Ecology or the EPA, which meet the equivalent of the technical requirements of Permit Conditions II.K.1 through II.K.4, may be considered as satisfying the requirements of this Permit.

II.L Design and Operation of the Facility

II.L.1 Proper Design and Construction

The Permittees will design, construct, maintain, and operate the Facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous substances to air, soil, ground water, or surface water, which could threaten human health, or the environment.

II.L.2 Design Changes, Nonconformance, and As-Built Drawings

II.L.2.a After completing the Permit modification process in Permit Condition I.C.3, the Permittees will conduct all construction subject to this Permit in accordance with the approved designs, plans and specifications that are required by this Permit, unless authorized otherwise in Permit Conditions II.L.2.b or II.L.2.c. For purposes of Permit Conditions II.L.2.b and II.L.2.c, an Ecology construction inspector, or TSD unit manager, are designated representatives of Ecology.

II.L.2.b During construction of a project subject to this Permit, changes to the approved designs, plans and specifications will be formally documented. All design change documentation will be maintained in the TSD unit-specific Operating Record and will be made available to Ecology upon request or during the course of an inspection. The Permittees will provide copies of design change documentation affecting any critical system to Ecology within five (5) working days of initiating the design change documentation. Identification of critical systems will be included by the Permittees in each TSD unit-specific dangerous waste Permit application, closure plan or Permit modification, as appropriate. Ecology will review a design change documentation modifying a critical system, and inform the Permittees in writing within two (2) working days, whether the proposed design change documentation, when issued, will require a Class 1, 2, or 3 Permit modification. If after two (2) working days Ecology has not responded, it will be deemed as acceptance of the design change documentation by Ecology.

II.L.2.c During construction of a project subject to this Permit, any work completed which does not meet or exceed the standards of the approved design, plans and specifications will be formally documented with nonconformance documentation. All nonconformance documentation will be maintained in the TSD unit-specific Operating Record and will be made available to Ecology upon request, or during the course of an inspection. The Permittees will provide copies of nonconformance documentation affecting any critical system to Ecology within five (5) working days after identification of the nonconformance. Ecology will review nonconformance documentation affecting a critical system and inform the Permittees in writing, within two (2) working days, whether a Permit modification is required for any nonconformance, and whether prior approval is required from Ecology before work proceeds, which affects the nonconforming item. If Ecology does not respond within two (2) working days, it will be deemed as acceptance and no Permit modification will be required.

II.L.2.d Upon completion of a construction project subject to this Permit, the Permittees will produce as-built drawings of the project which incorporate the design and construction modifications resulting from all project design change documentation and nonconformance documentation, as well as modifications made pursuant to WAC 173-303-830. The Permittees will place the drawings into the Operating Record within twelve (12) months of completing construction, or within an alternate period of time specified in a unit-specific Permit Condition in Part III or V of this Permit.

II.L.2.e Facility Compliance

The Permittees in receiving, storing, transferring, handling, treating, processing, and disposing of dangerous waste, will design, operate, and/or maintain the Facility in compliance with all applicable federal, state, and local laws and regulations.

II.M Security

The Permittees will comply with the security provisions of WAC 173-303-310. The Permittees may comply with the requirements of WAC 173-303-310(2) on a unit-by-unit basis.

II.N Receipt of Dangerous Wastes Generated Off-Site

II.N.1 Receipt of Off-Site Waste

The Permittees will comply with Permit Conditions II.N.2 and II.N.3 for any dangerous wastes which are received from sources outside the United States, or from off-site generators.

II.N.2 Waste from Sources Outside the United States

The Permittees will meet the requirements of WAC 173-303-290(1) for waste received from outside the United States.

II.N.3 Notice to Generator

For waste received from off-site sources (except where the owner/operator is also the generator), the Permittees will inform the generator in writing that they have the appropriate Permits for, and will accept, the waste the generator is shipping, as required by WAC 173-303-290(3). The Permittees will keep a copy of this written notice as part of the TSD unit-specific Operating Record.

II.O General Inspection Requirements

II.O.1 The Permittees will inspect the Facility to prevent malfunctions and deterioration, operator errors, and discharges, which may cause or lead to the release of dangerous waste constituents to the environment, or threaten human health. Inspections must be conducted in accordance with the provisions of WAC 173-303-320(2). In addition to the TSD unit inspections specified in Parts III, V, and/or VI, the following inspections will also be conducted:

II.O.1.a The 100, 200 East, 200 West, 300, and 400 areas will be inspected annually.

II.O.1.b The Permittees will inspect the banks of the Columbia River, contained within the Facility boundary, once a year. The inspection will be performed from the river, by boat, and the inspectors will follow the criteria in Permit Condition II.O.1.c.

II.O.1.c The Permittees will visually inspect the areas identified in Permit Conditions II.O.1.a and II.O.1.b for malfunctions, deterioration, operator errors, and discharges which may cause or lead to the release of dangerous waste constituents to the environment, or that threaten human health. Specific items to be noted are as follows:

II.O.1.c.i Remains of waste containers, labels, or other waste management equipment;

II.O.1.c.ii Solid waste disposal sites not previously identified for remedial action;

II.O.1.c.iii Uncontrolled waste containers (e.g., orphan drums);

II.O.1.c.iv Temporary or permanent activities that could generate an uncontrolled waste form; and

II.O.1.c.v Unpermitted waste discharges.

II.O.1.d The Permittees will notify Ecology at least seven (7) days prior to conducting these inspections in order to allow representatives of Ecology to be present during the inspections.

II.O.2 If the inspection by the Permittees, conducted pursuant to Permit Condition II.O.1, reveals any problems, the Permittees will take remedial action on a schedule agreed to by Ecology.

II.O.3 The inspection of high radiation areas will be addressed on a case-by-case basis in either Part III of this Permit, or prior to the inspections required in Permit Condition II.O.1.

II.P Manifest System

II.P.1 The Permittees will comply with the manifest requirements of WAC 173-303-370 for waste received from off-site and WAC 173-303-180 for waste shipped off-site.

II.P.2 Transportation of dangerous wastes along roadways, if such routes are not closed to general public access at the time of transport, can be manifested pursuant to an alternate tracking system as allowed by WAC 173-303-180(5). The alternate tracking system can be a paper system or an electronic system. The roadways addressed by this condition are a public or private right-of-way within or along the border of contiguous property where

the movement is under control of the USDOE.
The alternate tracking system will consist of documentation between the offering Hanford Facility location and the receiving Hanford Facility location containing the following information:

II.P.2.a Hanford Facility offeror name, location, and telephone number;

II.P.2.b Hanford Facility receiver name, location, and telephone number;

II.P.2.c Description of waste;

II.P.2.d Number and type of containers;

II.P.2.e Total quantity of waste;

II.P.2.f Unit volume/weight;

II.P.2.g Dangerous waste number(s) or U.S. Department of Transportation hazard class; and

II.P.2.h Special handling instructions including emergency contacts.

II.P.3 The Hanford Facility offeror and receiver will resolve any discrepancies of information found related to Permit Conditions II.P.2.a through II.P.2.h.

II.P.4 If the discrepancies cannot be resolved at the Hanford Facility receiving location, a new Hanford Facility receiver location will be agreed upon, or the dangerous waste will be returned to the offeror location. The documentation accompanying the movement of dangerous waste will be updated to reflect the new receiving location.

II.Q On-Site Transportation

II.Q.1 Documentation must accompany any on-site dangerous waste which is transported to or from any TSD unit subject to this Permit, through or within the 600 Area, unless the roadway is closed to general public access at the time of shipment. Waste transported by rail or by pipeline is exempt from this Condition. This documentation will include the following information, unless other unit-specified provisions are designated in Part III or V of this Permit:

II.Q.1.a Generator's name, location, and telephone number;

II.Q.1.b Receiving TSD unit's name, location, and telephone number;

II.Q.1.c Description of waste;

II.Q.1.d Number and type of containers;

II.Q.1.e Total quantity of waste;

II.Q.1.f Unit volume/weight;

II.Q.1.g Dangerous waste number(s); and

II.Q.1.h Any special handling instructions.

II.Q.2 All non-containerized solid, dangerous waste transported to or from TSD units, subject to this Permit, will be covered to minimize the potential for material to escape during transport.

II.R Equivalent Materials

II.R.1 The Permittees may substitute an equivalent or superior product for any equipment or materials specified in this Permit. Use of equivalent or superior products will not be considered a modification of this Permit. A substitution will not be considered equivalent unless it is at least as effective as the original equipment or materials in protecting human health and the environment.

II.R.2 The Permittees will place in the Operating Record (within seven [7] days after the change is put into effect) the substitution documentation, accompanied by a narrative explanation, and the date the substitution became effective. Ecology may judge the soundness of the substitution.

II.R.3 If Ecology determines that a substitution was not equivalent to the original, it will notify the Permittees that the Permittees' claim of equivalency has been denied, of the reasons for the denial, and that the original material or equipment must be used. If the product substitution is denied, the Permittees will comply with the original approved product specification, or find an acceptable substitution.

II.S Land Disposal Restrictions (LDR)

Unless specifically identified otherwise in the HFFACO, the Permittees will comply with all LDR requirements as set forth in WAC 173-303-140.

II.T Access and Information

To the extent that work required by this Permit must be done on property not owned or controlled by the Permittees, the Permittees must utilize their best efforts to obtain access and information at these locations.

II.U Mapping of Underground Piping

II.U.1 Reserved.

II.U.2 Reserved.

II.U.3 The Permittees will maintain piping maps for existing, newly identified, and/or new dangerous waste underground pipelines (including active, inactive, and abandoned pipelines, which contain or contained dangerous waste subject to the provisions of Chapter 173-303 WAC) at the Hanford Facility. The maps will identify the origin, destination, direction of flow, size, depth and type (i.e., reinforced concrete, stainless steel, cast iron, etc.), of each pipe, and the location of their diversion boxes, valve pits, seal pots, catch tanks, receiver tanks, and pumps, and utilize Washington State Plane Coordinates, NAD 83(91), meters. If the type of pipe material is not documented on existing drawings, the most probable material type will be provided. The maps will also identify whether the pipe is active, inactive, or abandoned. The age of all pipes requiring identification pursuant to this Condition will be documented in an Attachment to the submittal. If the age cannot be documented, an estimate of the age of the pipe will be provided based upon best engineering judgment. These maps need not include the pipes within a fenced tank farm or within a building/structure. These maps will be compiled using documented QA/QC control methods and procedures outlined in DOE/RL-96-50, *Hanford Facility RCRA Permit Mapping and Marking of Dangerous Waste Underground Pipelines Report*, September 1996. These maps and any Attachments will be maintained in the Facility Operating Record and be updated annually as required by Permit Condition II.U.4.

II.U.4 Permittees will maintain current all maps required by Permit Condition II.U.3. These maps will be updated to incorporate new or revised information available by March 30th of each year. By September 30th of each year, the Permittees will submit to Ecology a list of maps that have been updated. The updated maps (including any Attachments) and the annual list submitted to Ecology will be maintained in the Facility Operating Record.

II.V Marking of Underground Piping

The Permittees will maintain marking of underground pipelines located outside the 200 East, 200 West, 300, 400, 100N, and 100K Areas. These pipelines will be marked at the point they pass beneath an area fence, at their origin and destination, at any point they cross an improved road, and every 100 meters along the pipeline corridor where practicable. The markers will be labeled with a sign that reads "Buried Dangerous Waste Pipe" and will be visible from a distance of fifteen (15) meters.

II.W Other Permits and/or Approvals

II.W.1 The Permittees will be responsible for obtaining all other applicable federal, state, and local permits authorizing the development and operation of the Facility. To the extent that work required by this Permit must be done under a permit and/or approval pursuant to other regulatory authority, the Permittees will use their best efforts to obtain such permits.

II.W.2 All other permits related to dangerous waste management activities are severable and enforceable through the permitting authority under which they are issued.

II.W.3 All air emissions from units subject to this Permit will comply with all applicable state and federal regulations pertaining to air emission controls, including but not limited to, Chapter 173-400 WAC, General Regulations for Air Pollution Sources; Chapter 173-460 WAC, Controls for New Sources of Toxic Air Pollutants; and Chapter 173-480 WAC, Ambient Air Quality Standards and Emission Limits for Radionuclides.

II.X Schedule Extensions

II.X.1 The Permittees will notify Ecology in writing, as soon as possible, of any deviations or expected deviations, from the schedules of this Permit. The Permittees will include with the notification all information supporting their claim that they have used best efforts to meet the required schedules. If Ecology determines that the Permittees have made best efforts to meet the schedules of this Permit, Ecology will notify the Permittees in writing by certified mail, that the Permittees have been granted an extension. Such an extension will not require a Permit modification under Permit Condition I.C.3. Should Ecology determine that the Permittees have not made best efforts to meet the schedules of this Permit, Ecology may take such action as deemed necessary.

Copies of all correspondence regarding schedule extensions will be kept in the Operating Record.

II.X.2 Any schedule extension granted through the approved change control process identified in the HFFACO will be incorporated into this Permit. Such a revision will not require a Permit modification under Permit Condition I.C.3.

II.Y Corrective Action

In accordance with WAC 173-303-646 and WAC 173-303-815(2)(b)(ii), the Permittees must conduct corrective action, as necessary to protect human health and the environment, for releases of dangerous waste and dangerous constituents from solid waste management units and areas of concern at the Facility, including releases that have migrated beyond the Facility boundary. The Permittees may be required to implement measures within the Facility to address releases, which have migrated beyond the Facility's boundary. As specified in permit conditions II.Y.1.g, II.Y.2.a.iii, and II.Y.2.a.ii, the Permittee's right to challenge Ecology's authority to impose corrective action with respect to radionuclides, CERCLA Past Practice (CPP) Units (as identified under Permit Condition II.Y.2.a) and selected solid waste management units not covered by the HFFACO at property currently subleased to US Ecology, Inc. (as identified under Permit Condition II.Y.3.a.i), is reserved until such time as Ecology chooses to impose corrective action in accordance with the permit modification procedures of WAC 173-303-830.

II.Y.1 Compliance with Chapter 173-340 WAC

In accordance with WAC 173-303-646, the Permittee must conduct corrective action "as necessary to protect human health and the environment". To ensure that corrective action will be conducted as necessary to protect human health and the environment, except as provided in Permit Condition II.Y.2, the Permittee must conduct corrective action in a manner consistent with the following provisions of Chapter 173-340 WAC:

II.Y.1.a As necessary to select a cleanup action in accordance with WAC 173-340-360 and WAC 173-340-350 State Remedial Investigation and Feasibility Study.

II.Y.1.b WAC 173-340-360 Selection of Cleanup Actions.

II.Y.1.c WAC 173-340-400 Cleanup Actions.

II.Y.1.d WAC 173-340-410 Compliance Monitoring Requirements.

II.Y.1.e WAC 173-340-420 Periodic Site Reviews.

II.Y.1.f WAC 173-340-440 Institutional Controls.; and

II.Y.1.g WAC 173-340-700 through -760 Cleanup Standards, except that to the extent that Ecology seeks to impose corrective action with respect to radionuclides regulated under the provisions of the Atomic Energy Act, as amended, 42 U.S.C. § 2011 et.seq. (AEA), the Permittees may challenge Ecology's authority to impose such corrective action through a timely appeal of the Permit modification issued by Ecology without argument from Ecology that such right has been waived by a failure to fully litigate that issue through an appeal taken within thirty (30) days of the issuance of this Permit, and without argument from the Permittees that such requirement fails to satisfy a cause for Permit modification under WAC 173-303-830(3)(a).

II.Y.2 Acceptance of Work Under Other Authorities or Programs and Integration with the HFFACO.

Corrective action is necessary to protect human health and the environment for all units identified in Appendix B and Appendix C of the HFFACO. Notwithstanding Permit Condition II.Y.1, work under other cleanup authorities or programs, including work under the HFFACO, may be used to satisfy corrective action requirements, provided it protects human health and the environment.

II.Y.2.a For past practice units identified in Appendix C of the HFFACO, as amended, as CERCLA Past Practice (CPP) Units, Ecology accepts work under the HFFACO, as amended, and under the CERCLA program, as satisfying corrective action requirements to the extent provided for in, and subject to the reservations and requirements of, Permit Conditions II.Y.2.a.i through II.Y.2.a.iv.

II.Y.2.a.i For any past practice unit identified in Appendix C of the HFFACO as a CPP unit, the Permittee must comply with the requirements and schedules related to investigation and cleanup of the CPP unit(s) developed and approved under the HFFACO, as amended. The requirements and schedules related to investigation and cleanup of CPP units currently in place under the HFFACO, as amended, and in the future developed and approved under the HFFACO, as amended, are incorporated into this Permit by this reference and apply under this Permit as if they were fully set forth herein. If the Permittee is not in compliance with requirements of the HFFACO, as amended, that relate to investigation or cleanup of CPP unit(s), Ecology may take action to independently enforce the requirements as corrective action requirements under this Permit.

II.Y.2.a.ii For any past practice unit identified in Appendix C of the HFFACO as a CPP unit, in the case of an interim Record of Decision (ROD), a final decision about satisfaction of corrective action requirements will be made in the context of issuance of a final ROD.

II.Y.2.a.iii If EPA and Ecology, after exhausting the dispute resolution process under Section XXVI of the HFFACO, cannot agree on requirements related to investigation or cleanup of CPP unit(s), Ecology will notify the Permittees, in writing, of the disagreement and impose, in accordance with the permit modification procedures of WAC 173-303-830, a requirement for the Permittees to conduct corrective action for the subject units(s) in accordance with Permit Condition II.Y.1. The Permittees may challenge Ecology's authority to impose such corrective action requirements through a timely appeal of such Permit modification, without argument from Ecology that the Permittee's right to raise such challenge has been waived by a failure to fully litigate that issue through an appeal taken within thirty (30) days of the issuance of this Permit, and without argument from the Permittee that such requirement fails to satisfy a cause for Permit modification under WAC 173-303-830(3)(a). Within 60 days of receipt of the above Permit modification, or within some other reasonable period of time agreed to by Ecology and the Permittees, the Permittees must submit for Ecology review and approval, a plan to conduct corrective action in accordance with Permit Condition II.Y.1 for the subject unit(s). The Permittee's plan may include a request that Ecology evaluate work under another authority or program. Approved corrective action plans under this Permit Condition will be incorporated into this Permit in accordance with the Permit Modification Procedures of WAC 173-303-830.

II.Y.2.a.iv The Permittees must maintain information on corrective action for CPP units covered by the HFFACO in accordance with Sections 9.0 and 10.0 of the HFFACO Action Plan. In addition, the Permittees must maintain all reports and other information developed in whole, or in part, to implement the requirements of Permit Condition II.Y.2.a, including reports of investigations and all raw data, in the Hanford Facility Operating Record in accordance with Permit Condition II.I. Information that is maintained in the Hanford Site Administrative Record may be incorporated by reference into the Hanford Facility Operating Record.

II.Y.2.b For past practice units identified in Appendix C of the HFFACO, as amended, as RCRA-CERCLA Past Practice (R-CPP) units, Ecology accepts work under the HFFACO, as amended, as satisfying corrective action requirements to the extent provided for, and subject to the reservations and requirements of, Permit Conditions II.Y.2.b.i through II.Y.2.b.ii.

II.Y.2.b.i For any past practice unit identified in Appendix C of the HFFACO, as amended, as an R-CPP unit, the Permittees must comply with the requirements and schedules related to investigation and cleanup of R-CPP units developed and approved under the HFFACO, as amended. The requirements and schedules related to investigation and cleanup of R-CPP units currently in place under the HFFACO, as amended, and in the future developed and approved under the HFFACO, as amended, are incorporated into this Permit by this reference and apply under this Permit as if they were fully set forth herein. If the Permittee is not in compliance with requirements and schedules related to investigation and cleanup of R-CPP units developed and approved under the HFFACO, as amended, Ecology may take action to independently enforce the requirements as corrective action requirements under this Permit.

II.Y.2.b.ii The Permittees must maintain information on corrective action for R-CPP units covered by the HFFACO, as amended, in accordance with Sections 9.0 and 10.0 of the HFFACO Action Plan. In addition, the Permittees must maintain all reports and other information developed in whole, or in part, to implement the requirements of Permit Condition II.Y.2.b, including reports of investigations and all raw data, in the Hanford Facility Operating Record in accordance with Permit Condition II.I. Information that is maintained in the Hanford Site Administrative Record may be incorporated into the Hanford Facility Operating Record by reference.

II.Y.2.c For each TSD unit, when the Permittees submit a certification of closure or a certification of completion of post-closure care, or at an earlier time agreed to by Ecology and the Permittees, the Permittees must, at the same time, either:

II.Y.2.c.i Document that the activities completed under closure and/or post-closure satisfy the requirements for corrective action; or

II.Y.2.c.ii If the activities completed under closure and/or post-closure care do not satisfy corrective action requirements, identify the remaining corrective action requirements and the schedule under which they will be satisfied, if remaining corrective action requirements will be satisfied by work developed and carried out under the HFFACO provisions for R-CPP units or CPP units, a reference to the appropriate R-CPP or CPP process and schedule will suffice.

II.Y.2.c.iii Ecology will make final decisions as to whether the work completed under closure or post-closure care satisfies corrective action, specify any unit-specific corrective action requirements, and incorporate the decision into this Permit in accordance with the permit modification procedures of WAC 173-303-830.

II.Y.2.d Notwithstanding any other condition in this Permit, Ecology may directly exercise any administrative or judicial remedy under the following circumstances:

II.Y.2.d.i Any discharge or release of dangerous waste, or dangerous constituents, which are not addressed by the HFFACO, as amended.

II.Y.2.d.ii Discovery of new information regarding dangerous constituents or dangerous waste management, including but not limited to, information about releases of dangerous waste or dangerous constituents which are not addressed under the HFFACO, as amended.

II.Y.2.d.iii A determination that action beyond the terms of the HFFACO, as amended, is necessary to abate an imminent and substantial endangerment to the public health, or welfare, or to the environment.

II.Y.3 Releases of Dangerous Waste or Dangerous Constituents Not Covered By the HFFACO:

II.Y.3.a US Ecology

II.Y.3.a.i The following solid waste management units are not covered by the HFFACO:

II.Y.3.a.i.a US Ecology, Inc., SWMU 1: Chemical Trench.

II.Y.3.a.i.b US Ecology, Inc., SWMU 2-13: Low-Level Radioactive Waste Trenches 1 through 11A.

II.Y.3.a.i.c US Ecology, Inc., SWMU 17: Underground Resin Tank.

II.Y.3.a.ii Selected solid waste management units identified in Permit Condition II.Y.3.a.i are currently being investigated by US Ecology in accordance with the Comprehensive Investigation US Ecology – Hanford Operations Workplan. Following completion of this investigation and any closure required of such solid waste management unit under the authority of the Washington State Department of Health, or within one year of the effective date of this Permit Condition, whichever is earlier, Ecology will make a tentative decision as to whether additional investigation or cleanup is necessary to protect human health or the environment for the solid waste management units identified in Permit Condition II.Y.3.a.i, and publish that decision as a draft permit in accordance with WAC 173-303-840(10). Following the associated public comment period, and consideration of any public comments received during the public comment period, Ecology will publish as final Permit conditions under WAC 173-303-840(8) either:

II.Y.3.a.ii.a A decision that corrective action is not necessary to protect human health or the environment;

II.Y.3.a.ii.b An extension to the schedule established under Permit Condition II.Y.3.a.ii, or

II.Y.3.a.ii.c A decision, that corrective action, in accordance with Permit Condition II.Y.1, is necessary to protect human health or the environment.

II.Y.3.a.iii If Ecology decides under Permit Condition II.Y.3.a.ii that corrective action is necessary to protect human health or the environment, the Permittees may challenge Ecology's authority to impose such corrective action requirements through a timely appeal of such permit modification, without argument from Ecology that the right to raise such challenge has been waived by a failure to fully litigate that issue through an appeal taken within 30 days of the issuance of this Permit, and with argument from the Permittees that such requirement fails to satisfy a cause for permit modification under WAC 173-303-830(3)(a). Within 180 days of receipt of the above Permit modification, the Permittees must submit, for Ecology review and approval, a plan to conduct corrective action in accordance with Permit Condition II.Y.1. Approved corrective action plans under this condition will be incorporated into this Permit in accordance with the Permit Modification Procedures of WAC 173-303-830.

II.Y.3.b Newly Identified Solid Waste Management Units and Newly Identified Releases of Dangerous Waste or Dangerous Constituents.

The Permittees must notify Ecology of all newly-identified solid waste management units and all newly-identified areas of concern at the Facility. For purposes of this condition, a 'newly-identified' solid waste management unit or a 'newly-identified' area of concern is a unit or area not identified in the HFFACO, as amended, on the effective date of this condition and not identified by Permit Condition II.Y.3.a.

Notification to Ecology must be in writing and must include, for each newly-identified unit or area, the information required by WAC 173-303-806(4)(a)(xxiii) and WAC 173-303-806(4)(a)(xxiv). Notification to Ecology must occur at least once every calendar year, in January, and must include all units and areas newly identified since the last notification, except that if a newly identified unit or area may present an imminent and substantial endangerment to human health or the environment, notification must occur within five days of identification of the unit or area. If information required by WAC 173-303-806(4)(a)(xxiii) or WAC 173-303-806(4)(a)(xxiv) is already included in the Waste Information Data System, it may be incorporated by reference into the required notification.

II.Z Waste Minimization

In accordance with WAC 173-303-380(1)(q), and Section 3005(h) of RCRA, 42 U.S.C. 6925(h), the Permittee must place a certification in the Hanford Facility Operating Record, Unit-Specific Files on an annual basis that:

II.Z.1.a A program is in place to reduce the volume and toxicity of hazardous waste generated to the degree determined by the Permittee to be economically practicable; and,

II.Z.1.b The proposed method of treatment, storage or disposal is that practicable method currently available to the Permittee, which minimizes the present and future threat to human health and the environment.

II.Z.2 The Permittee will maintain each such certification of waste minimization in the operating record as required by Permit Condition II.I.1.

II.AA Air Emission Standards for Process Vents

The Permittees will comply with applicable requirements of WAC 173-303-690 for process vents associated with Part III units performing specific separations processes unless exempted by WAC 173-303-690(1)(d). Threshold limits applied to process vents potentially requiring emission controls subject to WAC 173-303-690 are evaluated based on the summation of applicable emission sources for the entire Hanford Facility. When the summed emissions fall below threshold limits in 40 CFR 264.1032(a)(1), no emission control devices are required. If threshold limits in 40 CFR 264.1032(a)(1) are predicted to be exceeded, the Permittees will notify Ecology to determine the appropriate course of action. Unit-specific information is contained in Part III of the Permit for applicable units.

II.BB Air Emission Standards for Equipment Leaks

The Permittees will comply with applicable requirements of WAC 173-303-691 for certain equipment leaks associated with Part III units unless exempted by WAC 173-303-691(1)(e) or (f). Air emission standards apply to equipment that contacts or contains hazardous wastes with organic concentrations of at least 10 percent by weight. Unit-specific information is contained in Part III of the Permit for applicable units.

II.CC Air Emission Standards for Tanks, Surface Impoundments, and Containers

The Permittees shall comply with applicable requirements of WAC 173-303-692 for containers, tanks, and surface impoundment areas associated with Part III units unless exempted by WAC 173-303-692(1)(b). Unit-specific information is contained in Part III of the Permit for applicable units.

PART III UNIT-SPECIFIC CONDITIONS FOR FINAL STATUS OPERATIONS

Operating Unit 2, PUREX Storage Tunnels

Operating Unit 3, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility

Operating Unit 4, 242-A Evaporator

Operating Unit 5, 325 Hazardous Waste Treatment Units

Operating Unit 10, Waste Treatment and Immobilization Plant

Operating Unit 11, Integrated Disposal Facility

Operating Unit 16, 400 Area Waste Management Unit

PART IV UNIT SPECIFIC CONDITIONS FOR CORRECTIVE ACTION

Corrective Action Unit 1, 100-NR-1

PART V UNIT-SPECIFIC CONDITIONS FOR UNITS UNDERGOING CLOSURE

Closure Unit 1, 1325-N Liquid Waste Disposal Facility

Closure Unit 2, 1301-N Liquid Waste Disposal Facility

Closure Unit 3, 1324-N Surface Impoundment and 1324-NA Percolation Pond

PART VI UNIT-SPECIFIC CONDITIONS FOR UNITS IN POST-CLOSURE

Post Closure Unit 1, 300 Area Process Trenches

Post Closure Unit 2, 183-H Solar Evaporation Basins

UNITS RETIRED FROM THE PERMIT

100 D Ponds (Closed 8/9/99)

105-DR Large Sodium Fire Facility (Closed 7/1/04)

100-NR-2 Operable Unit (9/30/09)

200 West Area Ash Pit Demolition Site (Closed 11/28/95)

2101-M Pond (Closed 11/28/95)

216-B-3 Expansion Ponds (Closed 7/31/95)

218-E-8 Borrow Pit Demolition Site (Closed 11/28/95)

224-T Transuranic Waste Storage and Assay Facility (Closed 11/12/08)

241-Z Treatment and Storage Tanks (Closed 2/22/07)

2727-S Nonradioactive Dangerous Waste Storage Facility (Closed 7/31/95)

300 Area Solvent Evaporator (Closed 7/31/95)

300 Area Waste Acid Treatment System (Closed 10/30/2005)

303-K Storage Facility (Closed 7/22/02)

303-M Oxide Facility (Closed 6/15/06)

304 Concretion Facility (Closed 1/21/96)

305-B Storage Facility (Closed 7/2/07)

3718-F Alkali Metal Treatment and Storage Facility Closure Plan (Closed 8/4/98)

4843 Alkali Metal Storage Facility Closure Plan (Closed 4/14/97)

Hanford Patrol Academy Demolition Site (Closed 11/28/95)

Plutonium Finishing Plant Treatment Unit (Closed 2/8/05)

Simulated High Level Waste Slurry Treatment and Storage Unit (Closed 10/23/95)

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400 Area Waste Management Unit

Change Control Log

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated and transparent manner. Each unit addendum will have a "**Last Modification Date**" which represents the last date the portion of the unit has been modified. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Last modification to 400 Area Waste Management Unit **August 25, 2016**

Addenda	Last Modification Date	Modification Number
Conditions	08/25/2016	8c.2016.Q2
A. Part A Form	06/30/2012	
B. Waste Analysis Plan	06/30/2012	
C. Process Information	12/31/2012	
D. Reserved		
E. Procedures to Prevent Hazards	08/25/2016	8c.2016.Q2
F. Preparedness & Prevention	09/30/2012	
G. Personnel Training	06/30/2013	
H. Closure Plan	06/30/2009	
I. Inspection	09/30/2015	8c.2015.Q3
J. Contingency Plan	05/23/2016	8c.2016.Q1

PART III, OPERATING UNIT GROUP 16 PERMIT CONDITIONS
400 AREA WASTE MANAGEMENT UNIT

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PART III, OPERATING UNIT GROUP 16 PERMIT CONDITIONS
400 AREA WASTE MANAGEMENT UNIT

UNIT DESCRIPTION:

The 400 Area Waste Management Unit (WMU) is in the Property Protected Area (PPA) at the Fast Flux Test Facility (FFTF), in Hanford's 400 Area. The 400 Area WMU consists of two container storage units:

- Fuel Storage Facility (FSF, Building 403). The FSF is a large steel-frame, metal-sided, high bay building. Its dimensions are 34 x 27 x 12 meters (112 x 90 x 40 feet). The container storage unit is on the ground-level floor. In it are two large steel boxes that store sodium-contaminated core component pots (CCPs). The Permittees do not plan to store more mixed waste than is currently stored in the facility; however, the FSF is physically capable of storing additional mixed waste. They will store any additional wastes at the 400 Area WMU in the Interim Storage Area.
- Interim Storage Area, 4718 (ISA). The ISA consists of 156 x 247 meters (513 x 247 feet) totally fenced area. This area is for aboveground dry cask storage of spent fuel. A concrete pad in the ISA, which measures 27 x 37 meters (90 x 120 feet), was used for dry cask storage, but will not necessarily be used for mixed waste management. The rest of the ISA surface is gravel. The ISA is generally flat. However, it is graded to drain in accordance with the general drainage plan for the FFTF PPA. Inside the ISA, there is also one building along the west fence line, and open on the side. This building, Building 432A, is not authorized for mixed waste management.

The scale map in Addendum A shows the location of each storage unit. The only mixed waste stored in these two container storage units is elemental sodium, and sodium potassium (D001, D003, and WSC2), sodium hydroxide (D002), and potassium hydroxide (D002) and debris (e.g., piping, equipment, and components) contaminated with elemental sodium, sodium potassium, sodium hydroxide, and potassium hydroxide. The 400 Area WMU will not store, treat, or dispose of bulk metallic sodium or bulk sodium hydroxide.

LIST OF ADDENDA SPECIFIC TO OPERATING UNIT GROUP 16

Addendum A	Part A Form, dated June 30, 2012
Addendum B	Waste Analysis Plan, dated June 30, 2012
Addendum C	Process Information, dated December 31, 2012
Addendum D	Groundwater Monitoring – Reserved
Addendum E	Procedures to Prevent Hazards, dated June 30, 2016
Addendum F	Preparedness and Prevention, dated September 30, 2012
Addendum G	Personnel Training, dated June 30, 2013
Addendum H	Closure Plan, dated June 30, 2009
Addendum I	Inspection Requirements, dated September 5, 2012
Addendum J	Contingency Plan, dated March 31, 2016

DEFINITIONS

The term **"CCP" or Core Component Pot** means one of 109 cylindrical containers, each containing 3.75 gallons of un-reacted sodium totaling 405 gallons, currently stored as mixed waste in the FFTF Fuel Storage Facility. The CCPs were previously filled with sodium and used in the FFTF Interim Decay Storage Vessel to store spent FFTF Driver Fuel Assemblies under inert gas.

ACRONYMS

FFTF	Fast Flux Test Facility
CCP	Core Component Pot
PPA	Property Protected Area
ISA	Interim Storage Area
FSF	Fuel Storage Facility
WMU	Waste Management Unit

III.16.A COMPLIANCE WITH UNIT-SPECIFIC PERMIT CONDITIONS

III.16.A.1 The Permittees will comply with all conditions in this Chapter and its addenda with respect to dangerous waste management and dangerous waste management units in the 400 Area WMU, in addition to conditions in Permit Parts I and II.

III.16.B GENERAL WASTE MANAGEMENT

III.16.B.1 The Permittees are authorized to accept, according to the waste acceptance procedure documented in Addendum B, Section B.2, mixed debris generated from demolition and decommissioning of the Fast Flux Test Facility reactor system containing or contaminated with residual elemental sodium and sodium hydroxide. The Permittee will store these wastes in the ISA.

III.16.B.2 The Permittees are authorized to store core component pots generated prior to the effective date of this permit in two large metal boxes in the 400 Area WMU, FSF.

III.16.B.3 The Permittees are authorized store mixed waste in the ISA up to a maximum capacity of 19,000 gallons.

III.16.B.4 The Permittees will maintain the physical structure of dangerous waste management units in the 400 Area WMU as documented in the Unit Description above and Addendum C, Figures C.1 and C.2.

III.16.B.5 The Permittees will maintain appropriate administrative controls and work practices to ensure that only wastes specified in Permit Condition III.16.B.1, are received by the ISA for storage, and that no co-mingling or cross-contamination of the waste stream specified in Permit Condition III.16.B.1 with any other waste stream may occur.

III.16.C WASTE ANALYSIS

III.16.C.1 The Permittees will have an accurate and complete waste profile for the waste stream identified in Permit Condition III.16.B.1. This waste profile will be signed and dated upon approval by the 400 Area WMU authorized representative. [WAC 173-303-380(1)(a)]

III.16.C.2 The Permittees will make a copy of the waste profile required by Permit Condition III.16.C.1 available upon request. [WAC 173-303-815(2)(b)(ii)]

III.16.D RECORDKEEPING AND REPORTING

III.16.D.1 The Permittees will place the following into the Hanford Facility Operating Record, 400 Area WMU File required by Permit Condition II.I.2. [WAC 173-303-380]

III.16.D.2 Records required by WAC 173-303-380(1)(o), incorporated by reference.

III.16.E SECURITY

III.16.E.1 The Permittees will post warning signs at all entrances to the FSF and the ISA specified in Addendum E, Section E.1.1. [WAC 173-303-310(2)(a)]

III.16.F PREPAREDNESS AND PREVENTION

III.16.F.1 The Permittees will comply with the Addendum F, Preparedness and Prevention requirements specific to the 400 Area WMU. [WAC 173-303-340]

III.16.G CONTINGENCY PLAN

III.16.G.1 The Permittees will comply with Addendum J, Contingency Plan in addition to the requirements of Permit Condition II.A when applicable. [WAC 173-303-350]

III.16.H INSPECTIONS

III.16.H.1 The Permittees will perform inspections of the 400 Area WMU according to Addendum I, Inspection Plan for inspecting all monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that help prevent, detect, or respond to hazards to the public health or the environment pursuant to the requirements of WAC 173-303-320. [WAC 173-303-320(2)]

III.16.I TRAINING PLAN

III.16.I.1 The Permittees will include Addendum G unit-specific training requirements in the written training plan required by Permit Condition II.C. [WAC 173-303-330]

III.16.J OTHER GENERAL REQUIREMENTS

III.16.J.1 The Permittees will comply with the requirements of WAC 173-303-395(1)(a)-(c), incorporated by reference, for prevention of reaction of ignitable, reactive, or incompatible wastes.

III.16.J.2 Land Disposal Restriction Requirements

III.16.J.2.a The Permittees will ensure a schedule of compliance and any applicable associated work requirements are included in the land disposal restrictions report required by the Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestone M-26, incorporated by reference by Permit Condition II.O for treatment and/or acquisition of treatment capacity for wastes which are or are expected to be stored in the 400 Area WMU container storage units.

III.16.K CLOSURE

III.16.K.1 The Permittees will close the 400 Area WMU Container Storage Units in accordance with Addendum H, Closure Plan. [WAC 173-303-610(4)]

III.16.L POST CLOSURE

Reserved

III.16.M CRITICAL SYSTEMS

Reserved

III.16.N RESERVED

III.16.O CONTAINERS

III.16.O.1 Container Management Standards

III.16.O.1.a The Permittees will ensure that all containers remain in good condition. If a container holding mixed waste is not in good condition (e.g., severe rusting or corrosion, or apparent structural defects), or if it begins to leak, the Permittee must transfer the waste from the container to a container that is in good condition or place the leaking container in an appropriate over-pack container. [WAC 173-303-630(2)]

III.16.O.1.b The Permittees shall ensure that all containers are constructed of carbon steel or stainless steel, or other materials compatible with metallic sodium and sodium hydroxide. [WAC 173-303-630(4)]

III.16.O.1.c The Permittees must remove spilled or leaked waste within secondary containment pursuant to WAC 173-303-630(7)(a)(ii), incorporated by reference.

III.16.O.1.d Requirements for the Fuel Storage Facility

III.16.O.1.e The Permittee will maintain an inert gas (argon or nitrogen) cover within each large metal box to prevent contact of the metallic sodium with the water vapor in the air and the formation of free liquids.

III.16.O.1.f The Permittees will place large boxes stored in the FSF in drip pans to ensure a base free of cracks or gaps, and ensure that the large boxes are elevated or otherwise protected from contact with accumulated liquids.

III.16.O.1.g Requirements for the Interim Storage Area

III.16.O.1.h The Permittee may store wastes in the ISA in standard metal containers (e.g., 208-liter drums), large metal boxes fabricated to accommodate the size and shape of a particular component or debris, or unique components removed from FFTF that when closed in accordance with WAC 173-303-630(5)(a) serve as a primary container.

III.16.O.1.i The Permittees will manage unique components stored in the ISA on the gravel surface with sufficient open space between components and between components and the fence line to accommodate inspections and movement of equipment.

III.16.O.1.j The Permittees will not place wastes in the open-sided structure (Building 432A) within the ISA identified in the Unit Description above.

ADDENDUM E
PROCEDURES TO PREVENT HAZARDS

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ADDENDUM E
PROCEDURES TO PREVENT HAZARDS

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E. PROCEDURES TO PREVENT HAZARDS

The 400 Area WMU is designed and operated to minimize exposure of the general public and operating personnel to waste. Shielding, control of toxic or dangerous material, safety and security procedures, and structures are used to keep exposure within as low as reasonably achievable (ALARA) requirements. In addition, the 400 Area WMU is designed to withstand accidents without undue risk to the health and safety of the general public and operating personnel.

E.1 Security Requirements

Refer to Permit Attachment 3, Security.

E.1.1 Security Procedures and Equipment

The 400 Area WMU is located within the 400 Area property protection area (PPA) of the Hanford Facility and access is controlled by physical barriers, which complies with WAC 173-303-310(2)(c). Signs stating *Danger-Unauthorized Personnel Keep Out*, or equivalent language, legible at 7.6 meters (25 feet) or more, are posted near the entrance of each mixed waste storage area.

E.1.2 Waiver

Waiver of the security procedures and equipment requirements for the 400 Area WMU is not requested.

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Integrated Disposal Facility

Change Control Log

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated and transparent manner. Each unit addendum will have a "**Last Modification Date**" which represents the last date the portion of the unit has been modified. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Last modification to Integrated Disposal Facility **August 25, 2016**

Chapters	Last Modification Date	Modification Number
Conditions	08/25/2016	8c.2016.Q2
1.0 Part A Form	10/01/2008	
2.0 Topographic Map Description	09/30/2014	
3.0 Waste Analysis Plan	06/30/2013	
4.0 Process Information	12/31/2008	
4A1 Phase I Critical Systems Design Report	08/25/2016	8c.2016.Q2
4A2 Critical Systems Tables & Data Sheets	03/31/2008	
4A3 Critical Systems Design Drawings	03/31/2008	
4B Detailed Design Cell 1 Construction Quality Assurance Plan	04/09/2006	
4C Facility Response Action Plan	04/09/2006	
4D Construction Specifications (C-1)	12/31/2006	
5.0 Groundwater Monitoring	06/30/2010	
6.0 Procedures to Prevent Hazards	06/20/2013	
7.0 Reserved		
8.0 Personnel Training	09/30/2014	
9.0 Reserved		
10.0 Reserved		
11.0 Closure Plan	09/30/2014	
12.0 Reserved		
13.0 Other Federal and State Laws	04/09/2006	
Addendum J.1 Pre-Active Life Contingency Plan	05/23/2016	8c.2016.Q1
Addendum J.2 Active Life Contingency Plan	05/23/2016	8c.2016.Q1

PART III, OPERATING UNIT 11 UNIT-SPECIFIC CONDITIONS
INTEGRATED DISPOSAL FACILITY

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PART III, OPERATING UNIT 11 UNIT-SPECIFIC CONDITIONS
INTEGRATED DISPOSAL FACILITY

This document sets forth the operating conditions for the Integrated Disposal Facility (IDF).

III.11.A COMPLIANCE WITH APPROVED PERMIT

The Permittees shall comply with all requirements set forth in the Integrated Disposal Facility (IDF) Permit conditions, the Chapters and Appendices specified in Permit Condition III.11.A and the Amendments specified in Permit Conditions III.11.B through III.11.I. All subsections, figures, and tables included in these portions are enforceable unless stated otherwise:

<u>OPERATING UNIT 11:</u>

Chapter 1.0	Part A Form, dated October 1, 2008
Chapter 2.0	Topographic Map Description, dated September 30, 2014
Chapter 3.0	Waste Analysis Plan, dated June 30, 2013
Chapter 4.0	Process Information, dated December 31, 2008
Appendix 4A	Design Report (as applicable to critical systems), dated June 30, 2016
Appendix 4B	Construction Quality Assurance Plan, dated April 9, 2006
Appendix 4C	Response Action Plan, dated April 9, 2006
Appendix 4D	Construction Specifications (RPP-18489, Rev. 1), dated December 31, 2006
Chapter 5.0	Ground Water Monitoring, dated June 30, 2010
Chapter 6.0	Procedure to Prevent Hazards, dated June 20, 2013
Addendum J.1	Contingency Plan – Pre-Active Life, dated March 31, 2016
Addendum J.2	Contingency Plan – Active Life, dated March 31, 2016
Chapter 8.0	Personnel Training, dated September 30, 2014
Chapter 11.0	Closure, dated September 30, 2014
Chapter 13.0	Other Federal and State Laws, dated April 9, 2006

General and Standard Hanford Facility RCRA Permit, WA7 89000 8967 (Permit) conditions (Part I and Part II Conditions) applicable to the IDF are identified in Permit Attachment 9 (Permit Applicability Matrix).

III.11.B AMENDMENTS TO THE APPROVED PERMIT

III.11.B.1 Portions of Permit Attachment 4, *Hanford Emergency Management Plan* that are not made enforceable by inclusion in the applicability matrix for that document, are not made enforceable by reference in this document.

III.11.B.2 Permittees must comply with all applicable portions of the Permit. The facility and unit-specific recordkeeping requirements are distinguished in the General Information Portion of the Permit, and are tied to the Permit conditions.

III.11.B.3 The scope of this Permit is restricted to the landfill construction and operation as necessary to dispose of: 1) immobilized low activity waste from the WTP, and 2) the Demonstration Bulk Vitrification System and IDF operational waste as identified in Chapter 4.0. Future expansion of the RCRA trench, or disposal of other wastes not specified in this Permit, is prohibited unless authorized via modification of this Permit.

III.11.B.4 In accordance with WAC 173-303-806(11)(d), this Permit shall be reviewed every five (5) years after the effective date and modified, as necessary, in accordance with WAC 173-303-830(3).

III.11.B.5 Inspection Requirements – Pre-Active Life Period and Active Life Period

III.11.B.5.a The Permittees will conduct inspections of the IDF according to the following requirements:

III.11.B.5.a.i Prior to the start of the active life of the IDF as defined in WAC 173-303-040, according to Chapter 6.0, Table 6.2.

III.11.B.5.a.ii Following the start of the active life of the IDF as defined in WAC 173-303-040, according to Chapter 6.0, Table 6.2A.

III.11.B.5.b The Permittees will remedy any problems revealed by inspections conducted pursuant to permit condition III.11.B.5.a on a schedule, which prevents hazards to the public health and the environment and as agreed to in writing, by Ecology. Where a hazard is imminent or has already occurred, remedial action must be taken immediately.

III.11.B.5.c Reserved

III.11.B.5.d Rainwater Management

III.11.B.5.e Prior to the start of the active life of the IDF, the Permittees will manage the discharge of such water in accordance with the pollution prevention and best management practices required by State Waste Discharge Permit Number ST 4511.

III.11.B.5.e.i Management of Liquids Collected in the Leachate Collection and Removal System (LCRS), Leak Detection System (LDS), and Secondary Leak Detection System (SLDS) prior to the start of the active life of the IDF.

III.11.B.5.e.ii Permittees shall manage the liquid in the LCRS system in a manner that does not allow the fluid head to exceed 30.5 cm above the flat 50-foot by 50-foot LCRS sump High Density Polyethylene (HDPE) bottom liner, and the LCRS sump trough, except for storms that exceed the 25-year, 24-hour storm event [(WAC 173-303-665(2)(h)(ii)(B). Liquid with a depth greater than 30.5 cm above the LCRS liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.B.5.e.iii Accumulated liquid of pumpable quantities in the LDS and SLDS will be managed in a manner that does not allow the fluid head to exceed 30.5 cm above the LDS liner or SLDS liner [WAC 173-303-665(2)(h)(i)(C)(iii)]. Liquid with a depth greater than 30.5 cm above a liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.B.5.e.iv The Permittees will use a flow meter to check if the amount of actual liquid pumped corresponds to the amount accumulated in the leachate collection tank to verify the proper function of the leachate collection and removal sump pumps with each use. The Permittees will document in the IDF portion of the facility operating record appropriate quality assurance/quality control requirements for selection and operation of the flow meter based on the required verification. In addition, the Permittees will evaluate the leachate transfer lines for freeze and thaw damage when ambient conditions may cause such damage to occur. The Permittees will document the methods and criteria used for purposes of this evaluation, along with an appropriate justification.

III.11.B.5.e.v The Permittee will inspect for liquids after significant rainfall events.

III.11.B.5.e.vi The Permittee will annually verify monitoring gauges and instruments are in current calibration; calibration will be performed annually or more frequently at intervals suggested by the manufacturer (refer to Chapter 4.0, §4.3.7.4)

III.11.B.5.f The Permittees will monitor liquids in the Leachate Collection and Removal System and Leak Detection System to ensure the action leakage rate (Chapter 4.0, Appendix 4A) is not exceeded.

III.11.B.5.g Soil Stabilization

Prior to the first placement of waste in the IDF, the Permittee will apply soil stabilization materials as needed to prevent soil erosion in and around the landfill.

III.11.C Design Requirements

III.11.C.1 IDF is designed in accordance with WAC 173-303-665 and WAC 173-303-640 as described in Chapter 4.0. Design changes impacting IDF critical systems shall be performed in accordance with Permit Conditions III.11.D.1.d.i and III.11.D.1.d.ii.

III.11.C.1.a IDF Critical Systems include the following: The leachate collection and removal system (LCRS), leachate collection tank (LCT), leak detection system (LDS), liner system (LS), and closure cap. H-2 Drawings for the LCRS, LCT, LDS, and LS are identified in Appendix 4A, Section 3 of this Permit. Drawings for the closure cap will be provided pursuant to Permit Condition III.11.C.1.c.

The Permittees shall construct and operate the IDF in accordance with all specifications contained in RPP-18489 Rev 0. Critical systems, as defined in the definitions section of the Site-Wide RCRA Permit, are identified in Appendix 4A, Section 1 of this Permit.

III.11.C.1.b Landfill Cap

At final closure of the landfill, the Permittees shall cover the landfill with a final cover (closure cap) designed and constructed [WAC 173-303-665(6), WAC 173-303-806(4)(h)] to: Provide long-term minimization of migration of liquids through the closed landfill; Function with minimum maintenance; Promote drainage and minimize erosion or abrasion of the cover; Accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of any bottom liner system or natural sub soils present.

III.11.C.1.c Compliance Schedule

Proposed conceptualized final cover design is presented in Chapter 11, Closure Requirements. Six months prior to start of construction of IDF landfill final cover (but no later than 6 months prior to acceptance of the last shipment of waste at the IDF), the Permittees shall submit IDF landfill final cover design, specifications and Construction Quality Assurance (CQA) plan to Ecology for review and approval. No construction of the final cover may proceed until Ecology approval of the final design is given, through a permit modification.

III.11.C.1.d The Permittees shall notify Ecology at least sixty (60) calendar days prior to the date it expects to begin closure of the IDF landfill in accordance with WAC 173-303-610(c).

III.11.C.2 Design Reports

III.11.C.2.a New Tank Design Assessment Report

Permittees shall generate a written report in accordance with WAC 173-303-640(3)(a), providing the results of the leachate collection tank system design assessment. The report shall be reviewed and certified by an Independent Qualified Registered Professional Engineer (IQRPE)[1] in accordance with WAC-173-303-810(13)(a).

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[1] "Independent qualified registered professional engineer," as used here and elsewhere with respect to Operating Unit 11, means a person who is licensed by the state of Washington, or a state which has reciprocity with the state of Washington as defined in

III.11.C.2.b Compliance Schedule

Permittees shall submit the leachate collection tank design assessment report to Ecology along with the IQRPE certification, prior to construction of any part of the tank system including ancillary equipment.

III.11.D CONSTRUCTION REQUIREMENTS

III.11.D.1 Construction Quality Assurance

III.11.D.1.a Ecology shall provide field oversight during construction of critical systems. In cases where an Engineering Change Notice (ECN) and/or Non Conformance Report (NCR) are required, Ecology and the Permittees shall follow steps for processing changes to the approved design per Permit Conditions III.11.D.1.d.i and III.11.D.1.d.ii.

III.11.D.1.b Permittees shall implement the CQA plan (Appendix 4B of the permit) during construction of IDF.

III.11.D.1.b.i The Permittees will not receive waste in the IDF until the owner or operator has submitted to Ecology by certified mail or hand delivery a certification signed by the CQA officer that the approved CQA plan has been successfully carried out and that the unit meets the requirements of WAC 173-303-665(2)(h) or (j); and the procedure in WAC 173-303-810(14)(a) has been completed. Documentation supporting the CQA officer's certification shall be furnished to Ecology upon request.

III.11.D.1.c Construction inspection reports

Permittees shall submit a report documenting the results of the leachate tank installation inspection. This report must be prepared by an independent, qualified installation inspector or a professional independent, qualified, registered, professional engineer either of whom is trained and experienced in the proper installation of tank systems or components. The Permittees will remedy all discrepancies before the tank system is placed in use. This report shall be submitted to Ecology 90 days prior to IDF operation and be included in the IDF Operating Record. [WAC 173-303-640(3)(h)].

III.11.D.1.d ECN/NCR Process for Critical Systems

Portions of the following conditions for processing engineering change notices and non-conformance reporting were extracted from and supersede Site Wide General Permit Condition II.L.

III.11.D.1.d.i Engineering Change Notice for Critical Systems

During construction of the IDF, the Permittees shall formally document changes to the approved designs, plans, and specifications, identified in Appendices 4A, 4B, 4C, and 4D of this permit, with an Engineering Change Notice (ECN).

The Permittees shall maintain all ECNs in the IDF unit-specific Operating Record and shall make them available to Ecology upon request or during the course of an inspection. The Permittees shall provide to Ecology copies of proposed ECNs affecting any critical system within five (5) working days of initiating the ECN. Identification of critical systems is included in Permit Condition III.11.C.1 and Appendix 4A of this permit. Within five (5) working days, Ecology will review a proposed ECN modifying a critical system and inform the Permittees whether the proposed ECN, when issued, will require a Class 1, 2, or 3 Permit modification.

RCW 18.43.100, and who is not an employee of the owner or operator of the facility for which construction or modification certification is required. A qualified professional engineer is an engineer with expertise in the specific area for which a certification is given.

III.11.D.1.d.ii Non-conformance Reporting for Critical Systems

III.11.D.1.d.ii.a During construction of the IDF, the Permittees shall formally document with a Nonconformance Report (NCR), any work completed which does not meet or exceed the standards of the approved design, plans and specifications, identified in Appendices 4A, 4B, 4C and 4D of this Permit. The Permittees shall maintain all NCRs in the IDF unit-specific Operating Record and shall make them available to Ecology upon request, or during the course of an inspection.

III.11.D.1.d.ii.b The Permittees shall provide copies of NCRs affecting any critical or regulated system to Ecology within five (5) working days after identification of the nonconformance. Identification of critical systems is included in Permit Condition III.11.C.1 and Appendix 4A of this permit. Ecology will review a NCR affecting a critical system and notify the Permittees within five (5) working days, in writing, whether a Permit modification is required for any nonconformance, and whether prior approval is required from Ecology before work proceeds, which affects the nonconforming item.

III.11.D.1.d.ii.c As-Built Drawings

Upon completing construction of IDF, the Permittees shall produce as-built drawings of the project, which incorporate the design and construction modifications resulting from all project ECNs and NCRs, as well as modifications made pursuant to WAC 173-303-830. The Permittees shall place the drawings into the Operating Record within twelve (12) months of completing construction.

III.11.D.2 The Permittees shall not reduce the minimum frequency of destructive testing less than one test per 500 feet of seam, without prior approval in writing from Ecology

III.11.E GROUND WATER AND GROUND WATER MONITORING

Ground water shall be monitored in accordance with WAC 173-303 and the provisions contained in the Ecology-approved facility ground water monitoring plan (Chapter 5.0). All wells used to monitor the ground water beneath the unit shall be constructed in accordance with the provisions of WAC 173-160.

III.11.E.1 Ground Water Monitoring Program

III.11.E.1.a Prior to initial waste placement in the IDF landfill, the Permittees shall sample all ground water monitoring wells in the IDF network twice quarterly for one first year to determine baseline conditions. For the first sampling event (and only the first), samples for each well will include all constituents in 40 CFR 264 Appendix IX. Thereafter, sampling will include only those constituents as specified in Chapter 5.0, Table 5-2: chromium (filtered and unfiltered the first year to compare results), specific conductance, TOC, TOX, and pH. Other constituents to be monitored but not statistically compared include alkalinity, anions, ICP metals, and turbidity. These will provide important information on hydrogeologic characteristics of the aquifer and may provide indications of encroaching contaminants from other facilities not associated with IDF.

III.11.E.1.b After the baseline monitoring is completed, and data is analyzed, the Permittees and Ecology shall assess revisions to Chapter 5.0, Table 5-2. Subsequent samples will be collected annually and will include constituents listed in Table 5-2 as approved by Ecology. All data analysis will employ Ecology approved statistical methods pursuant to WAC 173-303-645. Changes to Chapter 5.0 will be subject to the permit modification procedures under WAC 173-303-830.

III.11.E.1.c All constituents used as tracers to assess performance of the facility through computer modeling should be sampled at least annually to validate modeling results.

Groundwater monitoring data and analytes to be monitored will be reviewed periodically as defined in Chapter 5.0 of this Permit.

III.11.E.1.d Upon Ecology approval of the leachate monitoring plan, leachate monitoring and groundwater monitoring activities should be coordinated as approved by Ecology to form an effective and efficient means of monitoring the performance of the IDF facility.

III.11.E.1.e Groundwater monitoring data shall be reported to Ecology annually by July 31. The annual report shall include monitoring results for the 12-month period from January 1 through December 31.

III.11.F LEACHATE COLLECTION COMPONENT MANAGEMENT

Permittees shall design, construct, and operate all leachate collection systems to minimize clogging during the active life and post closure period

III.11.F.1 Leachate Collection and Removal System (LCRS)

III.11.F.1.a At least 120 days prior to initial waste placement in the IDF, the Permittees shall submit a Leachate monitoring plan to Ecology for review, approval, and incorporation into the permit. Upon approval by Ecology, this plan will be incorporated into the Permit as a class [1]1 modification. The Permittees shall not accept waste into the IDF until the requirements of the leachate monitoring plan have been incorporated into this permit.

III.11.F.1.b Leachate in the LCRS (primary sump) shall be sampled and analyzed monthly for the first year of operation of the facility and quarterly thereafter (pursuant to WAC 173-303-200). Additionally, leachate shall be sampled and analyzed to meet waste acceptance criteria at the receiving treatment storage and disposal facility.

III.11.F.1.c Permittees shall manage the leachate in the LCRS system in a manner that does not allow the fluid head to exceed 30.5 cm above the flat 50-foot by 50-foot LCRS sump HDPE bottom liner except for rare storm events as discussed in Chapter 4.0, §4.3.6.1 and the LCRS sump trough (WAC 173-303-665(2)(h)(ii)(B). Liquid with a depth greater than 30.5 cm above the SLDS liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.F.1.d After initial waste placement, Permittees shall manage all leachate from the permitted cell as dangerous waste (designated with Dangerous Waste Number F039) in accordance with WAC 173-303.

III.11.F.2 Monitoring and Management of Leak Detection System (LDS/secondary sump)

III.11.F.2.a Permittees shall manage the leachate in the LDS system in a manner that does not allow the fluid head to exceed 30.5 cm above the LDS liner (WAC 173-303-665(2)(h)(ii)(B).

III.11.F.2.b Permittees shall monitor and record leachate removal for comparison to the Action Leakage Rate (ALR) as described in Appendix 4C, Response Action Plan. If the leachate flow rate in the LDS exceeds the ALR, the Permittees shall implement the Ecology approved response action plan (Appendix 4C).

III.11.F.2.c Leachate from the LDS (secondary sump) shall be sampled semi-annually if a pumpable quantity of leachate is available for sampling.

III.11.F.2.d Accumulated liquid of pumpable quantities in the LDS will be managed in a manner that does not allow the fluid head to exceed 30.5 cm above the LDS liner [WAC 173-303-665(2)(h)(i)(C)(iii)].

Liquid with a depth greater than 30.5 cm above the LDS liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.F.3 Monitoring and Management of the Secondary Leak Detection System (SLDS)

III.11.F.3.a At least 180 days prior to initial waste placement, the, the Permittees shall submit to Ecology for approval a sub-surface liquids monitoring and operations plan (SLMOP) for the SLDS to include the following: monitoring frequency, pressure transducer configuration, liquid collection and storage processes, sampling and analysis and response actions. The SLMOP shall be approved by Ecology prior to placement of waste in the IDF, and incorporated into the Permit as a Class [1]1 modification.

III.11.F.3.b Permittees shall monitor and manage the SLDS (tertiary sump) pursuant to the approved sub-surface liquids monitoring and operations plan.

III.11.F.3.c Accumulated liquid of pumpable quantities in the SLDS will be managed in a manner that does not allow the fluid head to exceed 30.5 cm above the SLDS liner [WAC 173-303-665(2)(h)(i)(C)(iii)]. Liquid with a depth greater than 30.5 cm above the SLDS liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.F.3.d After initial waste placement, Permittees shall manage all leachate from the permitted cell as dangerous waste in accordance with WAC 173-303.

III.11.G CONSTRUCTION WATER MANAGEMENT

III.11.G.1 During construction, it is anticipated that liquids will accumulate on top of all liners and sumps. Permittees shall manage the construction wastewater in accordance with State Waste Discharge Permit ST 4511.

III.11.G.2 Liquid accumulation within the LCRS, LDS, and SLDS prior to initial waste placement will be considered construction wastewater (i.e., not leachate).

III.11.H LANDFILL LINER INTEGRITY MANAGEMENT & LANDFILL OPERATIONS

III.11.H.1 Permittees shall design, construct, and operate the landfill in a manner to protect the liners from becoming damaged. Temperature: Waste packages with elevated temperatures shall be evaluated and managed in a manner to maintain the primary (upper) liner below the design basis temperature for the liner (e.g.,160 F). Weight: Waste, fill material and closure cover shall be placed in a manner that does not exceed the allowable load bearing capacity of the liner (weight per area 13,000 lb/ft^2). Puncture: At least 3 feet of clean backfill material shall be placed as an operations layer over the leachate collection and removal system to protect the system from puncture damage.

III.11.H.1.a All equipment used for construction and operations inside of the IDF shall meet the weight limitation as specified in Permit Condition III.11.H.1. Only equipment that can be adequately supported by the operations layer as specified in Permit Condition III.11.H.1 (e.g., will not have the potential to puncture the liner) shall be used inside of the IDF. All equipment used for construction and operations outside of the IDF shall not damage the berms. Changes to any equipment will follow the process established by condition II.R of the site wide permit. Within 120 days from the effective date for the permit, a process for demonstrating compliance with this condition shall be submitted for review by Ecology. This process will be incorporated into appropriate IDF operating procedures prior to IDF operations.

III.11.H.2 The Permittees shall construct berms and ditches to prevent run-on and run-off in accordance with the requirements of Chapter 4, Section 4.3.8 of the IDF portion of this permit. Before the first placement of waste in the IDF, the Permittees shall submit to Ecology a final grading and topographical map on a scale sufficient to identify berms and ditches used to control run-on and run-off. Upon approval, Ecology will incorporate these maps into the permit as a Class [1]1 modification.

III.11.H.3 The Permittees shall operate the Resource Conservation and Recovery Act (RCRA) IDF Cell (Cell1) in accordance with WAC 173-303-665(2) and the operating practices described in Chapters 3.0, 4.0, 6.0, 8.0, Addendum J.1, Addendum J.2, and Appendix 4A, §1, subsection 7, except as otherwise specified in this Permit.

III.11.H.4 The Permittees shall maintain a permanent and accurate record of the three-dimensional location of each waste type, based on grid coordinates, within the RCRA IDF Cell (Cell1) in accordance with WAC 173-303-665(5).

III.11.I WASTE ACCEPTANCE CRITERIA

The only acceptable waste form approved for disposal at the RCRA cell of IDF are IDF operational waste, Immobilized Low Activity Waste (ILAW) in glass form from the Waste Treatment Plant (WTP) Low Activity Waste (LAW) Vitrification facility and ILAW from the Bulk Vitrification Research Demonstration and Development facility (up to 50 boxes). Specifics about waste acceptance criteria for each of these wastes are detailed below.

No other waste forms may be disposed at the RCRA cell of IDF unless authorized via a Final Permit modification decision. Requests for Permit modifications must be accompanied by an analysis adequate for Ecology to comply with SEPA, as well as by a risk assessment and groundwater modeling to show the environmental impact. Permit Condition III.11.I.5 outlines the process by which waste sources in the IDF are modeled in an ongoing risk budget and a ground water impact analysis.

III.11.I.1 Six months prior to IDF operations Permittees shall submit to Ecology for review, approval, and incorporation into the permit, all waste acceptance criteria to address, at a minimum, the following: physical/chemical criteria, liquids and liquid containing waste, land disposal restriction treatment standards and prohibitions, compatibility of waste with liner, gas generation, packaging, handling of packages, minimization of subsidence.

III.11.I.1.a All containers/packages shall meet void space requirements pursuant to WAC 173-303-665(12).

III.11.I.1.b Compliance Schedule

III.11.I.1.b.i Six months prior to IDF operations, the Permittees shall submit to Ecology for review, approval, and incorporation into the permit any necessary modifications to the IDF Waste Analysis Plan (Chapters 3.0 of the IDF portion of this permit).

III.11.I.2 ILAW Waste Acceptance Criteria

The only ILAW forms acceptable for disposal at IDF are: (1) approved glass canisters that are produced in accordance with the terms, conditions, and requirements of the WTP portion of the Permit, and (2) the 50 bulk vitrification test boxes as specified in the Demonstration Bulk Vitrification System (DBVS) test plans.

To assure protection of human health and the environment, it is necessary that the appropriate quality of glass be disposed at IDF. The Land Disposal Restrictions (LDR) Treatment Standard for eight metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver), when associated with High Level Waste, is High Level VIT (40 CFR 268). Because these metals are constituents in the Hanford Tanks Waste, the LDR standard for ILAW disposed to IDF is HLVIT.

For any ILAW glass form(s) that the United States Department of Energy (DOE) intends to dispose of in IDF, DOE will provide to Ecology for review, an ILAW Waste Form Technical Requirements Document (IWTRD). The IWTRD will contain:

III.11.I.2.a WTP ILAW Waste Acceptance Criteria

III.11.I.2.a.i A description of each specific glass formulation that DOE intends to use including a basis for why each specific formulation is proposed for use, which specific tank wastes the glass formulation is proposed for use with, the characteristics of the glass that are key to satisfactory performance (e.g., Vapor Hydration Test (VHT), Product Consistency Test (PCT), and Toxicity Characteristic Leaching Procedure (TCLP) and/or other approved performance testing methodologies that the parties agree are appropriate and necessary), the range in key characteristics anticipated if the specific glass formulation is produced on a production basis with tank waste, and the factors that DOE must protect against in producing the glass to ensure the intended glass characteristics will exist in the actual ILAW.

III.11.I.2.a.ii A performance assessment that provides a reasonable basis for assurance that each glass formulation will, once disposed of in IDF in combination with the other waste volumes and waste forms planned for disposal at the entire Integrated Disposal Facility, be adequately protective of human health and the environment; and will not violate or be projected to violate all applicable state and federal laws, regulations and environmental standards.

Within 60 days of a request by Ecology, the Permittees shall provide a separate model run using Ecology's assumptions and model input.

III.11.I.2.a.iii A description of production processes including management controls and quality assurance/quality control requirements that assure that glass produced for each formulation will perform in a reasonably similar manner to the waste form assumed in the performance assessment for that formulation.

The Permittees shall update the IWTRD consistent with the above requirements for review by Ecology consistent with their respective roles and authority as provided under the TPA. Ecology comments shall be dispositioned through the Review Comment Record (RCR) process and will be reflected in further modeling to modify the IDF ILAW Chapter 3.0, Waste Analysis Plan as appropriate.

The initial IWTRD contained glass formulation data as required by Permit Condition III.11.I.2.a.i, and was submitted on December 18, 2006 (AR Accession # 0906020182). The performance assessment required by Permit Condition III.11.I.2.a.ii, and the quality assurance/quality control requirements process required by Permit Condition III.11.I.2.a.iii shall be submitted for Ecology review as soon as possible after issuance of the Final Tank Closure and Waste Management Environment Impact Statement (EIS) and receipt of underlying codes and data packages, and at least 180 days prior to the date DOE expects to receive waste at IDF. At a minimum, the Permittees shall submit updates to the IWTRD to Ecology every five years or more frequently with the next one due June 30, 2015, if any of the following conditions exist:

- The Permittees submits a permit modification request allowing additional waste forms to be disposed of at IDF.
- The WTP or other vitrification facility change their glass formulations from those previously included in the IWTRD.
- An unanticipated event or condition occurs that Ecology determines would warrant an update to the IWTRD.

III.11.I.2.a.iv The Permittees shall not dispose of any WTP ILAW not described and evaluated in the IWTRD.

III.11.I.3 ILAW Waste Acceptance Criteria Verification

III.11.I.3.a Six months prior to disposing of ILAW in the IDF, the Permittees will submit an ILAW verification plan to Ecology for review and approval. This plan will be coordinated with WTP, Ecology, and the Permittees personnel. This plan will outline the specifics of verifying ILAW waste acceptance through WTP operating parameters, and/or glass sampling. The Plan will include physical sampling requirements for batches, glass formulations, and/or feed envelopes.

III.11.I.4 Demonstration Bulk Vitrification System (DBVS) Bulk Vitrification Waste Acceptance Criteria

III.11.I.4.a Bulk Vitrification waste forms that are acceptable to be disposed of at IDF are up to 50 boxes of vitrified glass produced pursuant to the DBVS Research, Development, and Demonstration (RD&D) Permit from processing Hanford Tank S-109 tank waste.

III.11.I.4.b If Bulk Vitrification is selected as a technology to supplement the Waste Treatment Plant, the IDF portion of the Permit will need to be modified to accept Bulk Vitrification Full Scale production waste forms. This modification will need to be accompanied by appropriate Tri-Party Agreement (TPA) changes (per M-062 requirements) and adequate risk assessment information sufficient for the Department of Ecology to meet its State Environmental Policy Act (SEPA) obligations.

III.11.I.4.c DBVS Waste Acceptance Verification will occur on 100% of the waste packages. Pursuant to the DBVS RD&D Permit, a detailed campaign test report will be produced and submitted to Ecology detailing results of all testing performed on each waste package that is produced. IDF personnel shall review these reports to verify that the waste packages meet IDF Waste Acceptance Criteria.

III.11.I.4.d The Permittees shall not dispose of any waste forms that do not comply with all appropriate and applicable treatment standards, including all applicable LDR.

III.11.I.5 Modeling – Risk Budget Tool

III.11.I.5.a The Permittees must create and maintain a modeling - risk budget tool, which models the future impacts of the planned IDF waste forms (including input from analyses performed as specified in Permit Conditions III.11.I.2.a through III.11.I.2.a.ii) and their impact to underlying vadose and ground water. This software tool will be submitted for Ecology review as soon as possible after issuance of Final Tank Closure and Waste Management EIS and receipt of underlying codes and data packages, and at least 180 days prior to the date DOE expects to receive waste at IDF. The risk budget tool shall be updated at least every 5 years. The model will be updated more frequently if needed, to support permit modifications or SEPA Threshold Determinations whenever a new waste stream or significant expansion is being proposed for the IDF. This risk budget tool shall be conducted in manner that is consistent with state and federal requirements, and represents a risk analysis of all waste previously disposed of in the entire IDF (both cell 1 and cell 2) and those wastes expected to be disposed of in the future for the entire IDF to determine cumulative impacts. The groundwater impact should be modeled to evaluate fate and transport in the groundwater aquifer(s) and should be compared against various performance standards including but not limited to drinking water standards (40 CFR 141 and 40 CFR 143). Ecology will review modeling assumptions, input parameters, and results and will provide comments to the Permittees. Ecology comments shall be dispositioned through the Review Comment Record (RCR) process and will be reflected in further modeling to modify the IDF ILAW waste acceptance criteria as appropriate.

III.11.I.5.a.i The modeling-risk budget tool will include a sensitivity analysis reflecting parameters and changes to parameters as requested by Ecology.

III.11.I.5.a.ii If these modeling efforts indicate results within 75% of a performance standard [including but not limited to federal drinking water standards (40 CFR 141 and 40 CFR 143)], Ecology and the Permittees will meet to discuss mitigation measures or modified waste acceptance criteria for specific waste forms.

III.11.I.5.a.iii When considering all the waste forms to be disposed of in IDF, the Permittees shall not dispose of any waste that will result (through forward looking modeling or in real groundwater concentrations data) in a violation of any state or federal regulatory limit, specifically including but not limited to drinking water standards for any constituent as defined in 40 CFR 141 and 40 CFR 143.

III.11.I.6 The Permittees shall not dispose of any waste that is not in compliance with state and federal requirements as identified in Chapter 13.0.

III.11.I.6.a In accordance with DOE's authority under the Atomic Energy Act of 1954, as amended and other applicable law, prior to disposing of any mixed immobilized low-activity waste (ILAW) in the IDF, DOE will certify to the State of Washington that it has determined that such ILAW is not high-level waste and meets the criteria and requirements outlined in DOE's consultation with the U.S. Nuclear Regulatory Commission beginning in 1993 (Letter from R.M. Bernero, USNRC to J. Lytle, USDOE, dated March 2, 1993; Letter from J. Kinzer, USDOE, to C. J. Paperiello, USNRC, Classification of Hanford Low-Activity Tank Waste Fraction, dated March 7, 1996; and Letter from C.J. Paperiello, USNRC, to J. Kinzer, USDOE, Classification of Hanford Low-Activity Tank Waste Fraction, dated June 9, 1997). While the requirement to provide such certification is an enforceable obligation of this permit, the provision of such certification does not convey, or purport to convey, authority to Ecology to regulate the radioactive hazards of the waste under this permit.

III.11.I.7 IDF Operational Waste Acceptance Criteria.

III.11.I.7.a IDF operational activities (including decontamination, cleanup, and maintenance) will generate a small amount of waste. Waste that can meet IDF waste acceptance without treatment will be disposed of at the IDF. All other IDF operational waste will be managed pursuant to WAC 173-303-200.

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APPENDIX 4A – SECTION 1
PHASE I CRITICAL SYSTEMS DESIGN REPORT

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APPENDIX 4A – SECTION 1
PHASE I CRITICAL SYSTEMS DESIGN REPORT

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
Affiliate	CH2M HILL, Inc.
AFI	Air freeze index
ALR	Action leakage rate
AOS	Apparent opening size
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
bgs	Below ground surface
CDN	Composite drainage net
CDR	Conceptual Design Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH2M HILL	CH2M HILL Hanford Group, Inc.
Design Report	IDF Phase I Critical Systems Design Report
DOE	U.S. Department of Energy
DBVS	Demonstration Bulk Vitrification System
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FH	Fluor Hanford, Inc.
FLA	Full load amperage
FS	Factor of safety
FVNR	Full Voltage Non-Reversing
GCL	Geosynthetic clay liner
GFCI	Ground fault circuit interrupters
gpm	Gallons per minute
GRI	Geosynthetic Research Institute
HDPE	High-density polyethylene
HEC	Hydraulic Engineering Circular-1
HELP	Hydrologic Evaluation of Landfill Performance (Model)
HF	Hanford Facility
HMS	Hanford Meteorological Station
HVAC	Heating, ventilating, and air conditioning
I/O	Input/output
ICDF	INEEL CERCLA Disposal Facility (Idaho Falls, ID)

IDF	Integrated Disposal Facility (Hanford)
IEEE	Institute of Electrical and Electronic Engineers
IES	Integrated Engineering Software, Inc.
ILAW	Immobilized low-activity waste
INEEL	Idaho National Environmental Engineering Laboratory
LAN	Local area network
LCRS	Leachate collection and removal system
LDS	Leak detection system
LERF	Liquid Effluent Retention Facility (Hanford)
LLW	Low-level waste
MBPS	Megabits per second
MCC	Motor control center
MLLW	Mixed low-level wastes
NEC	National Electrical Code
NFPA	National Fire Protection Association
OIU	Operator interface unit
ORP	Office of River Protection
PC	Performance category
PICS	Process Instrumentation and Control Systems
PLCs	Programmable logic controllers
PNNL	Pacific Northwest National Laboratory
psi	Pounds per square inch
PVC	Polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
RAP	Response Action Plan
RCRA	Resource Conservation and Recovery Act of 1976
RF	Radio frequency
RGS	Rigid galvanized steel
RPP	River Protection Project
SCADA	Supervisory control and data acquisition
SDR	Standard dimension ratio
SOW	Statement of work
SPT	Standard Penetration Testing
SSCs	Systems, structures, and components
STI	Soil Technology, Inc. (Bainbridge Island, Washington)

THW	Thermoplastic, vinyl insulated building wire; flame retardant, moisture and heat resistant, 75°C, dry and wet locations
TSD	Treatment Storage and Disposal facility
TRU	Transuranic waste (concentrations of transuranic radionuclides greater than or equal to 100nCi/g of the waste matrix)
UBC	Uniform Building Code
UPS	Uninterrupted power supply
USCS	Unified Soil Classification System
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
WTP	Waste Treatment and Immobilization Plant (Hanford)

1.0 INTRODUCTION

1.1 Purpose

The purpose of the Integrated Disposal Facility (IDF) is to develop the capability for near surface disposal of Immobilized Low-Activity Waste (ILAW) waste packages from the River Protection Project–Waste Treatment and Immobilization Plant (RPP-WTP). The IDF is essential in meeting the overall U.S. Department of Energy, Office of River Protection (ORP) mission to store, retrieve, treat, and dispose of the highly radioactive Hanford tank waste in an environmentally sound, safe, and cost-effective manner. The IDF will also provide capacity for disposal of mixed low-level waste (MLLW) and low-level (LLW) from the DBVS. The detailed design for the IDF Phase I Critical Systems landfill will finalize the design process for the:

- Landfill liner system
- Leachate removal system
- Leak detection system (LDS)

The IDF detailed design also involves completing all design work required for an operable landfill and supporting the Resource Conservation and Recovery Act of 1976 (RCRA) Part B permitting for the IDF.

This Phase I Critical Systems Design Report (the Design Report) provides documentation of engineering calculations, criteria, and information that have been developed as part of the IDF detailed design for Phase I. Specifically, the Design Report documents the following important design information:

- Identifies key design requirements for the project (Section 2).
- Summarizes studies on site conditions and investigations that have been used in the development of detailed design parameters for the critical systems (Sections 3 and 4).
- Presents detailed engineering analysis performed in the development of the Phase I Critical Systems design and updated during construction implementation (Section 5).
- Provides system component descriptions, references important construction quality assurance (QA) requirements, and describes important interfaces with non-critical systems (Section 6).
- Describes operating provisions that have influenced the development of the design including waste placement requirements, operational interfaces with other Hanford facilities, and leakage response action plan requirements (Section 7).

1.2 Scope

1.2.1 General

CH2M HILL, Inc. (Affiliate) is responsible for production of a cost-effective final design and to produce critical systems detailed design documents and construction specifications to facilitate RCRA permit approval of the IDF. The IDF technical requirements are found in the following documents:

- Immobilized Low-Activity Waste (ILAW) Project Definition Criteria, Revision 1 (RPP-7898)
- System Specifications for ILAW Disposal, Revision 3 (RPP-7307)
- Hanford Environmental Management Specification (DOE/RL-97-55)

Design products are to be prepared in compliance with the technical requirements, as well as with other specific procedures that are dictated by CH2M HILL Hanford Group, Inc. (CH2M HILL) requirements and outlined in the Statement of Work (SOW), *Integrated Disposal Facility Detailed Design Support* (Rev. 2, 2003), described in more detail under Section 2 of this Design Report. The overall design work includes reports, schedules, estimates, and other special services as specified in the SOW. As part of the design effort, the Affiliate will perform the following global tasks:

- Develop a conceptual layout and preliminary design drawings for the IDF. The IDF preliminary layout will depict a single expandable landfill system, with capability for segregation of RCRA regulated and non-regulated waste placement and segregated leachate management systems.
- Develop a detailed design that meets the requirements of the ILAW Project Definition Criteria and the ILAW System Specification.
- Develop the construction specifications for the detailed design.
- Ensure that there is full technical integration between all detailed design reports prepared for the detailed design of the IDF.
- Perform the design activities in accordance with all applicable regulatory requirements.

The design will implement the safety and health protection requirements imposed on the design by the SOW and the technical baseline criteria documents, and will comply with all applicable regulatory requirements for the project. It is important to note that although the design is for identified critical systems of the Phase I IDF, a preliminary safety evaluation was performed for the W-520 Project that identified no safety class items, including criticality safety (*Conceptual Design Report for ILAW Facility,* CH2M HILL, May 2001).

The timely completion of the critical system detail design of the IDF, in compliance with the RCRA permit approval process (Washington Administrative Code [WAC] 173-303-665 and 173-303-806[4][h]), is a critical component of the SOW. Drawings, construction specifications, and reports needed to obtain U.S. Department of Energy (DOE) certification and Washington State Department of Ecology (Ecology) approval of the IDF RCRA Part B permit is the overall goal of the project. The detailed design for the initial Phase I disposal landfill and the critical systems design include the liner system, the leachate collection system, and the LDS. The detailed design will produce an operable landfill design and support the IDF RCRA Part B permitting.

1.2.2 Design Report

The Design Report describes the key facility components and provides the design basis and detailed calculations that support the development of drawings and specifications. Key facility components that are described in the Design Report include:

- Facility layout (location, access roads and operational ramps, survey control system).
- Landfill geometry (disposal volume total and per disposal unit, disposal unit dimensions).
- Disposal unit grading design (foundation soils contour, lower admixture layer contour, operations layer cover contour).
- Grid point listing (grid point number, location, and elevation for all grid points required for construction of the IDF).
- Geosynthetic material design (primary geomembrane, secondary geomembrane, geotextile, and geocomposite drainage layer).
- Leachate collection and removal system (LCRS) and LDS design (sump design, removal system design–LCRS and LDS, leachate level monitoring system design, transfer pump as required to meet WAC-173-303-665(2)(h)(ii) to ensure that the leachate depth over the liner does not exceed 12 inches).
- Leachate temporary storage tank system design (tank volume, tank design, tank materials/ leachate compatibility, tank coating, tank secondary containment system), including electrical and power requirements necessary to support the leachate removal systems.
- Pump controls and instrumentation design (control, operations, monitoring, and control building design).
- Operational storm water management design.

- Backfill placement requirements and process (minimize void space, minimize subsidence of waste, placement and material requirements to ensure there are no adverse effects on the waste packages).
- Other facility designs identified as necessary to support the project completion.

The Design Report includes design calculations that are prepared in accordance with the requirements of procedure HNF-IP-0842 Vol. 4, Section 3.6 (July 30, 2002). Important calculations that are documented include:

Stability (liner side slope [each liner layer based on interface strength], requirements for verification for critical interface strengths, fill placement ramp, global stability of the overall design, and other relevant stability analysis).

Seismic analysis (side slope and global embankment stability under seismic loading, and seismic design of structures)

Bearing capacity (liner sub-grade soils and other relevant bearing capacity analysis)

Total settlement, differential settlement, and uplift analysis (foundations soils, compacted admixture layers, total settlement, top slope drainage evaluation, subsidence and sinkhole potential, uplift potential, and other relevant settlement analysis).

Admix liner analysis (liner admixture bearing capacity, admix liner specifications, desiccation cracking, and other relevant liner admixture analysis).

Geomembrane liner analysis (liner tension caused by thermal contraction/ expansion, anchor trench pullout analysis, puncture resistance, potential stress cracking, leachate compatibility, chemical and radiation resistance, mechanical degradation from operational traffic, and other relevant geomembrane analysis).

Drainage layers analysis (geotextile analysis and selection, geocomposite selection, drainage gravel selection analysis, and other relevant drainage analysis).

LCRS/LDS analysis (clogging prevention in LCRS, design of leachate collection sumps, design of high capacity and low capacity leachate removal pumping systems, design of leachate storage tank and secondary containment system, leachate depth monitoring system, design of leachate system control building, leachate compatibility of components in the LCRS, and other relevant leachate analysis).

Leachate system earth loading analysis (LCRS and LDS slope riser pipes, LCRS collection pipe, leachate transfer pipes, and other relevant system loading analysis).

Surface stormwater analysis (operations in-cell stormwater management, operations runon/runoff water management, site stormwater collection/evaporation management system, and other relevant storm water analysis).

Leachate production analysis (average annual leachate production, peak daily leachate production, leachate tank storage capacity, leachate transportation truck capacity, and trip frequency)

Action leakage rate (ALR) analysis (the maximum design flow rate that the secondary leachate collection, detection, and removal system can remove without the fluid head on the bottom liner exceeding one foot; calculation and justification of the maximum leachate infiltration rate through the primary liner system; a response action plan in case the maximum ALR is exceeded during operation of the IDF).

Updates to calculations that have occurred through the construction process, either during independent quality reviews of tank systems, in response to contractor's requests for information, or changes implemented during construction have been attached to the original calculations in the appendices.

Compliance matrices have been developed to demonstrate detailed design compliance with the applicable sections of the regulations (WAC 173-303) and with project-specific specifications, criteria, reports, codes, and standards.

Updates to the matrices that have resulted from the completion of construction activities and associated documentation are also provided. These matrices are presented in the Design Report in Appendix A.

1.3 Authorization

After careful consideration and evaluation, CH2M HILL elected to self-perform the IDF Phase I Critical Systems design. As such, the design is being performed as an inter-company work assignment by the Affiliate under the direction of CH2M HILL. CH2M HILL was authorized to self-perform the work by the U.S. Department of Energy, Office of River Protection (ORP), in a letter dated December 9, 2002.

CH2M HILL's Prime Contract Number with the ORP is DE-AC06-99RL14047. The inter-company work assignment is Contract 12317, Release 22, dated November 7, 2002.

1.4 General Facility Description

The IDF will consist of an expandable lined landfill located in the 200 East area on the Hanford Facility (HF). The landfill will be divided lengthwise into two distinct cells, one for disposal of low-level waste (LLW) and the other for disposal of mixed waste. The mission of the IDF will include the following functions:

- Provide an approved disposal facility for the permanent, environmentally safe disposition of ILAW packages that meets the environmental requirements and is approved by the DOE and Ecology.
- Receive ILAW from River Protection Project (RPP) tank operations and dispose this waste onsite. Receive waste from the DBVS and dispose this waste onsite.
- A more detailed discussion of waste types and the necessary storage volumes for these wastes is provided in Sections 5 and 6, respectively.
- The IDF will be constructed on 25 hectares of vacant land southwest of the Plutonium Uranium Extraction Facility (PUREX) Plant in the 200 East Area. The IDF will consist of a lined landfill that will be constructed in several phases. The landfill will be segregated into a RCRA permitted cell and a non-RCRA permitted cell. The scope of this permit is limited to the western cell of the landfill where the RCRA waste will be stored and disposed. The landfill is designed to accommodate four layers of vitrified LAW waste containers separated vertically by 0.9-meters of soil.
- This initial construction will start at the northern edge and the size is approximately 223 meters East/West by 233 meters North/South by 14 meters deep. At this initial size, IDF disposal capacity is 82,000 cubic meters of waste. Subsequent construction phase(s) will require a modification to the Part B Permit to be constructed after waste placement has progressed in the landfill to the point that additional disposal capacity is needed. This approach minimizes the open area susceptible to collection of rainwater and subsequent leachate
- The landfill is currently estimated at full build out to be up to 446 meters wide by 555 meters in length by up to 14 meters deep. The RCRA regulated portion of the landfill would be half of that at approximately 223 meters wide by 555 meters long by up to 14 meters deep providing a waste disposal capacity of up to 450,000 cubic meters.
- Both cells will have a RCRA C-compliant liner system that consists of an upper primary liner overlying a lower secondary liner. The upper liner will consist of a composite geomembrane liner and geosynthetic clay liner system on the bottom area, and a single geomembrane on the side slope. The secondary liner will consist of a composite geomembrane, overlying a 3-foot-thick soil admix liner. A LCRS and a LDS will overly the primary and secondary liner system, respectively. A Secondary Leak Detection System (SLDS) will be located below the clay liner, beneath the LDS sump.
- The IDF also will include a less than 90-day accumulation area of leachate for storage in two tanks, one per landfill half. The leachate storage tanks will be located at the north end, in close proximity to the lined landfill. Each tank will be protected by secondary containment

(double-lined tanks). Leak detection will be provided by monitoring of the secondary containment. The collected leachate will be stored and sampled before transfer to an onsite Treatment Storage and Disposal (TSD) unit or offsite TSD facility. The less than 90-day storage leachate collection tank will be operated in accordance with the generator provisions of WAC 173-303-200 and WAC 173-303-640, as referenced by WAC 173-303-200. The overall side development plan is shown in Figure 1-2.

- The landfill will be constructed in several phases. Starting at the northern edge, approximately one-third of the total length of the landfill will be constructed in Phase I. This will include the leachate collection system and 90-day accumulation tanks. The subsequent phases will be constructed after waste has been placed in the landfill and additional disposal capacity is needed. This approach will minimize the amount of open area susceptible to collection of rainwater and subsequent leachate.
- Before disposal, all waste will meet land disposal restriction requirements [Revised Code of Washington 70.105.050(2), WAC 173-303-140, and 40 Code of Federal Regulations (CFR) 268, incorporated by reference in WAC 173-303-140].
- Future landfill development and configuration within the IDF will be subject to change as disposal techniques improve or as waste management needs dictate. Additional IDF landfill development beyond the 62 acres will be subject to an approved permit modification, in accordance with the HF RCRA Permit (Ecology, 2001).
- Public access to the IDF will be restricted. Trucks typically will be used to transport waste to the IDF and will range in size from heavy-duty pickups to tractor-trailer rigs, depending on the size and weight of the load. In some cases, special equipment (such as transporters) will be used for unusual or unique loads. When special equipment is used, a prior evaluation will ensure that the equipment does not damage the roadways.
- Approximately 60 personnel will traverse this roadway daily in three shifts via personal vehicles per week

Figure 1-1. Integrated Disposal Facility Site Plan

Located in Chapter 1.0, Part A Form

Figure 1-2. Overall Site Development Plan/Transportation Routes

Located in Chapter 4.0, Figure 4.1

2.0 DESIGN REQUIREMENTS

Minimum design requirements for the IDF Phase I Critical Systems Design were provided by CH2M HILL in the SOW for Requisition # 92859, Integrated Disposal Facility Detailed Design Support, Revision 2, February 18, 2003. The IDF Phase I Critical Systems Design has been performed in compliance with all applicable design requirements, defined in Sections 2.1 through 2.7, and these requirements are:

- *Washington State Dangerous Waste Regulations* (WAC 173-303)
- *System Specification for Immobilized Low-Activity Waste Disposal System,* Revision 3 (RPP-7307)
- *ILAW Project Definition Criteria for Integrated Disposal Facility,* Revision 1 (RPP-7898)
- *Hanford Site Environmental Management Specification,* Revision 2 (DOE/RL-97-55)
- *Design Loads for Tank Farm Facilities* (TFC-ENG-STD-06, REV A)
- Technical baseline documents listed in Section 3.1 of the SOW
- Applicable national codes and standards

2.1 Washington State Dangerous Waste Regulations

The *Washington State Dangerous Waste Regulations* (WAC 173-303) implement Subtitle C of Public Law 94-580, the RCRA in the State of Washington. By conforming to the requirements of WAC 173-303, the design of the IDF Phase I Critical Systems also complies with the federal hazardous waste requirements contained in 40 CFR 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*. Appendix A.1 provides a compliance matrix of where the applicable WAC 173-303 requirements are addressed in the IDF Phase I Critical Systems detailed design documents, or are addressed in documentation developed as a result of facility construction.

2.2 System Specification

The *System Specification for Immobilized Low-Activity Waste Disposal System*, Revision 3 (RPP-7307) contains the Level 1 system requirements for the Immobilized Low-Activity Waste Disposal System, of which the IDF is a part. Appendix A.2 provides a compliance matrix of where the applicable Level 1 system requirements are addressed in the IDF Phase I Critical Systems detailed design documents, or are addressed in documentation developed as a result of facility construction.

2.3 Project Definition Criteria

The *ILAW Project Definition Criteria for Integrated Disposal Facility*, Revision 1 (RPP-7898) contains the design criteria for the IDF, including requirements flow-down from RPP-7303, *System Specification for ILAW Disposal System*, and DOE/RL-97-55, *Hanford Site Environmental Management Specification.* Appendix A.3 provides a compliance matrix of where the applicable design criteria are addressed in the IDF Phase I Critical Systems detailed design documents, or are addressed in documentation developed as a result of facility construction.

2.4 Hanford Site Environmental Management Specification

The *Hanford Site Environmental Management Specification* (site specification), Revision 2 (DOE/RL-97-55) documents the top-level mission technical requirements for work involved in the Richland Operations Office, Hanford Site cleanup and infrastructure activities, under the responsibility of the DOE Office of Environmental Management. It also provides the basis for all contract technical requirements. Section 3.3.2, 200 Area Materials and Waste Management of the site specification contains the requirements for receiving and onsite disposal of ILAW from RPP tank operations. The documents, orders, and laws referenced in the site specification represent only the most salient sources of requirements. As such, the site specification is assumed to have no significant measurable requirements that would directly affect the IDF Phase I Critical Systems design.

2.5 Design Loads for Tank Farm Facilities

The *Design Loads for Tank Farm Facilities* (TFC-ENG-STD-06, REV A) defines the design requirements for systems, structures, and components (SSCs), and provides the minimum criteria for structural design and evaluation of SSCs. The standard establishes structural design loads and acceptance criteria for use in designing new SSCs. Figure 1 of this standard indicates that for new SSCs, structures and anchorage of systems and components are to be designed per DOE-STD-1020-02 and Section 3.0 of this standard. These were used for the design of the IDF Critical Systems facilities. The IDF Critical Systems facilities were defined by CH2M HILL as being Performance Category (PC)-1. The PC-1 requirements in this standard were used in the structural design of the facilities included in IDF Phase I Critical Systems.

2.6 Technical Baseline Documents

The technical baseline documents are listed in Section 3.1 of the SOW. These documents include the System Specification for Immobilized Low-Activity Waste Disposal System, ILAW Project Definition Criteria for Integrated Disposal Facility, Hanford Site Environmental Management Specification, and Design Loads for Tank Farm Facilities, discussed in the preceding sections.

2.7 National Codes and Standards

In addition to WAC 173-303, the system specification, project definition criteria, site specification, and tank farm design loads that are discussed above, the IDF Phase I Critical Systems design was guided by other applicable sections of accepted professional and industry standards. These included the following:

- Air Moving and Conditioning Association
- American Association of State Highway and Transportation Officials (AASHTO)
- American Concrete Institute
- American Galvanizers Association
- American Institute of Steel Construction
- American Iron and Steel Institute
- American National Standards Institute
- American Society for Testing and Materials (ASTM)
- American Society of Civil Engineers (ASCE)
- American Society of Heating, Refrigerating, and Air-Conditioning Engineers
- American Society of Mechanical Engineers
- American Water Works Association (AWWA)
- American Welding Society
- Building Officials and Code Administrators – Basic Building Code
- Code of Federal Regulations (CFR)
- Concrete Reinforcing Steel Institute (CRSI)
- Federal Standards
- Geosynthetic Research Institute (GRI)
- Hydraulic Institute Standards
- Institute of Electrical and Electronic Engineers (IEEE)
- International Conference of Building Officials – Uniform Building Code (UBC)
- Manufacturers Standardization Society
- Metal Building Manufacturers Association
- National Electrical Code (NEC)
- National Electrical Manufacturers Association

- National Fire Protection Association (NFPA)
- National Institute of Standards and Technology
- Occupational Safety and Health Administration
- Sheet Metal and Air Conditioning Contractors National Association
- Steel Door Institute
- Steel Structures Painting Council
- Specialty Steel Institute of North America
- The Aluminum Association, Inc.
- Underwriters Laboratories, Inc.
- Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge and Municipal Construction

3.0 SITE CONDITIONS

This section presents information on the Hanford Site and the area on the site where the IDF will be located. This information was obtained primarily from the *ILAW Preliminary Closure Plan for the Disposal Facility* (RPP-6911) and other Hanford Site data sources. It is intended to provide a general characterization of the IDF site conditions that are pertinent to the design of the IDF Phase I Critical Systems.

3.1 Geography

The following paragraphs briefly describe the geography of the IDF site and are prepared from information in the *ILAW Preliminary Closure Plan for the Disposal Facility* (RPP-6911).

3.1.1 Site Location

The location of the IDF is on the Hanford Central Plateau, in the 200 East Area within the Hanford Site boundary. The site identified for the IDF is 68 hectares (168 acres) of vacant and uncontaminated land, located southwest of the PUREX plant in the 200 East Area. It is bounded on the south by 1st Street and on the north by 4th Street.

3.1.2 Site Description

The IDF landfill will occupy approximately 25 hectares (62 acres) of the site identified for the facility. The remainder of the site will be used for soil stockpile, leachate storage tanks, operations support facilities, roads, parking areas, and open space. The IDF in Phase I will be approximately 11 hectares (28 acres). Phase I will be located at the north end of the IDF landfill and will include provisions for expansion to the south for future phases.

3.2 Meteorology and Climatology

The following paragraphs briefly describe the climate of the IDF site and are prepared from information in the *ILAW Preliminary Closure Plan for the Disposal Facility* (RPP-6911), which presented summary data from the Hanford Meteorological Station (HMS). Conditions at the HMS are considered similar to those at the IDF site. Detailed information is available in the *Hanford Site Climatological Data Summary 2001, with Historical Data* (Pacific Northwest National Laboratory, May 2002). The IDF Phase I Critical Systems is designed to operate in the climatic conditions reported in that document.

3.2.1 Precipitation

The site sits within the Pasco Basin, characterized as a semi-arid region because of its low annual precipitation levels. The basin receives 16 cm (6.3 inches) of annual average precipitation, with nearly half occurring in the winter months. Historical records indicate that the annual precipitation has varied from a low of 8 cm (3.1 inches) to a high of 30 cm (11.8 inches). Precipitation of 4 cm (1.56 inches) in 24 hours reportedly can be expected to occur once every 25 years.

However, based on the *Hanford Site Climatological Data Summary 2001*, a value of 1.28 inches was used for the 24-hour, 25-year precipitation in the IDF Phase I Critical Systems stormwater design analysis (see Appendix C.9). Total annual snowfall has varied from 0.8 cm to 110 cm (0.31 to 43.3 inches), with an average annual snowfall of 34 cm (24.4 inches).

3.2.2 Temperature

Temperature conditions for the site range from extremely cold during the winter months to extremely warm during the summer months. Local temperatures can reach -18 degrees C (0 degrees F) during some winter months. January is the coldest month, with an average temperature of -2 degrees C (29 degrees F). The lowest temperature ever recorded was -33 degrees C (-27 degrees F). During some summer months, daytime temperatures can exceed 40 degrees C (104 degrees F). July is the warmest month, with daily high and low temperatures averaging 33 and 25 degrees C (92 and 61 degrees F), respectively. The highest temperature ever recorded was 46 degrees C (115 degrees F).

3.2.3 Wind

Wind conditions can vary considerably throughout the year. The monthly average is about 10 kilometers/hour (6 miles/hour) during the winter and 15 kilometers/hour (9 miles/hour) during the summer. Wind speeds, especially during summer storm activity, can reach many times the average levels. The greatest peak gust was 130 kilometers/hour (81 miles/hour), recorded at 15 meters (50 feet) above the ground at the HMS.

3.2.4 Relative Humidity

The seasonal variation in the relative humidity is considerable, according to records of the HMS. The annual mean relative humidity recorded at HMS is approximately 54 percent, with the highest monthly average relative humidity (80 percent) occurring in December and the lowest monthly average relative humidity (32 percent) occurring in July. Daily relative humidity can change 20 to 30 percent between early morning and late afternoon, except in the winter months when changes are less pronounced.

3.3 Ecology

The following paragraphs briefly describe the ecology of the Hanford Site and are prepared from information in the *ILAW Preliminary Closure Plan for the Disposal Facility* (RPP-6911). The site consists of undeveloped land and is characterized as a shrub-steppe environment. This environment contains numerous plants and animal species, adapted to the regions semi-arid climate. Because of the aridity and low water-holding capacity of the soils, the productivity of both plants and animals is relatively low. The IDF site exhibits many of these same general characteristics, although to varying degrees.

3.3.1 Flora

The dominant plants on the Hanford Site are big sagebrush, rabbitbrush, cheatgrass, Russian thistle, and Sandberg's bluegrass, with cheatgrass providing half of the plant cover. Root penetration to depths of over 3 m has not been demonstrated in the 200 Areas. Rabbitbrush roots have been found only at a depth of 2.4 m (8 feet) near the 200 Areas.

3.3.2 Fauna

A variety of birds and mammals inhabit the Hanford Site. The most abundant nesting birds of the shrub-steppe at the site are the horned lark and western meadowlark. Significant populations of chukar and grey partridge inhabit the Hanford Site. The most abundant mammals at the site are mice, ground squirrels, gophers, voles, and cottontail rabbits. Larger animals include mule deer and elk. The coyote is the principal mammalian predator on the Hanford Site.

3.4 Geology

3.4.1 Regional Geology

The 200 East Area lies on the Cold Creek bar, a geomorphic remnant of the cataclysmic, glacial related floods of the Pleistocene Epoch. As the floodwaters raced across the lowlands of the Pasco Basin and Hanford Site, floodwaters lost energy and began to deposit sand and gravel. The 200 Area Plateau is one of the most prominent deposits. The 200 Area Plateau lies just southwest of one of the major flood channels across the Hanford Site that forms the topographic lowland south of Gable Mountain.

Borehole data provide the principal source of geologic, hydrologic, and groundwater information for the 200 East Area and the IDF site. Numerous boreholes (both vadose zone boreholes and groundwater monitoring wells) have been drilled in the 200 East Area for groundwater monitoring and waste management studies (Figure 3-1 shows the location of groundwater wells near the IDF site). However, data are limited within the IDF site, primarily because no previous construction or waste disposal activities have occurred in this part of the HF. Most boreholes in the 200 East area have been drilled using the cable tool method and either a hard tool or drive barrel to advance the hole. Some boreholes have been drilled by rotary and wire-line coring methods. More recently, boreholes in the area have been drilled, and in five cases cored, by percussion hammer methods. Geologic logs are based on examination of drill core, chips, and cuttings from these boreholes. Chip samples typically are taken at 1.5-meter (4.92 feet) intervals and routinely archived at the Hanford Geotechnical Sample Library.

3.4.2 Site Geology

The IDF site will be located south of the Gable Mountain segment of the Umtanum Ridge anticline and about 3 kilometers (1.86 miles) north of the axis of the Cold Creek syncline, that controls the structural grain of the basalt bedrock and the Ringold Formation. The basalt surface and Ringold Formation trend roughly southeast-northwest parallel to the major geologic structures of the site. As a result, the Ringold Formation and the underlying Columbia River Basalt Group gently dip to the south off the Umtanum Ridge anticline into the Cold Creek syncline.

Geologic mapping on the Hanford Site and examination of drill core and borehole cuttings in the area have not identified any faults in the vicinity of the IDF site (DOE/RW-0164). The closest known faults are along the Umtanum Ridge-Gable Mountain structure, north of the disposal site and the May Junction Fault east of the site (Figure 3-2).

3.4.2.1 Stratigraphy

The basalt and post-basalt stratigraphy for the IDF site is shown in Figure 3-3. Approximately 137 to 167 meters (449 to 548 feet) of suprabasalt sediments overlie the basalt bedrock at the site.

Basalt Bedrock. Previous studies (RHO-BWI-ST-14; Reidel and Fecht, 1994) have shown that the youngest lava flows of the Columbia River Basalt Group at the 200 East Area are those of the 10.5 million-year old Elephant Mountain Member. This member underlies the entire 200 East area and surrounding area, and forms the base of the suprabasalt aquifer. No erosional windows in the basalt are known or suspected to occur in the area of the IDF site.

Ringold Formation. Few boreholes penetrate the entire Ringold Formation at the IDF site, so available data are limited. The Ringold Formation reaches a maximum thickness of 95 meters (312 feet) on the west side of the site and thins eastward. The member of Wooded Island (Figure 3-3) is the only member of the Ringold Formation in the 200 East Area. The deepest Ringold Formation unit encountered is the lower gravel, unit A. Lying above unit A is the lower mud, and overlying the lower mud is an upper gravel, unit E. The sand and silt units of the members of Taylor Flat and Savage Island of the Ringold Formation are not present at the IDF site. Unit A and unit E are equivalent to the Pliocene-Miocene continental conglomerates (Reidel and Fecht, 1994). The lower mud is equivalent to the Pliocene-Miocene continental sand, silt, and clay beds (Reidel and Fecht, 1994).

Only three boreholes have penetrated unit A in the area of the IDF site. Unit A is 19 meters (62 feet) thick on the west side of the site and thins to the northeast. Unit A is partly to well-cemented conglomerate consisting of both felsic and basaltic clasts in a sandy matrix and is interpreted as fluvial gravel facies (Lindsey, 1996). There are minor beds of yellow to white interbedded sand and silt. Green-colored, reduced-iron stain is present on some grains and pebbles. Although the entire unit appears to be cemented, the zone produced abundant high-quality water in borehole 299-E17-21 (PNNL-11957, 1998).

Nineteen meters (62 feet) of the lower mud unit were encountered in one borehole at the IDF site (PNNL-11957, 1998). The uppermost one-meter or so consists of a yellow mud to sandy mud. The yellow mud grades downward into about 10 meters (33 feet) of blue mud. The blue mud, in turn, grades down into seven meters (23 feet) of brown mud with organic rich zones and occasional wood fragments. The lower mud unit is absent in the center of the site (northeast of borehole 299-E24-7 on Figure 3-4).

Unit E is described as a sandy gravel to gravelly sand. Unit E is interpreted to consist of as much as 15 meters (49 feet) of conglomerate, with scattered large pebbles and cobbles up to 25 centimeters (9.84 inches) in size in a sandy matrix. The gravel consists of both felsic and basaltic rocks that are well rounded, with a sand matrix supporting the cobbles and pebbles. Cementation of this unit ranges from slight to moderate. The upper contact of unit E is not identified easily at the IDF site. In the western part of the study area, unconsolidated gravels of the Hanford formation directly overly the Ringold Formation unit E gravels, making exact placement of the contact difficult. The dominance of basalt and the absence of cementation in the Hanford formation are the key criteria used to distinguishing these (PNNL-11957, 1998). In the central and northeast part of the area, unit E has been eroded completely. Unconsolidated gravels and sands typical of the Hanford formation replace unit E.

Unconformity at the Top of the Ringold Formation. The surface of the Ringold Formation is irregular in the area of the IDF site. A northwest-southeast trending erosional channel or trough is centered through the northeast portion of the site. The trough is deepest near borehole 299-E24-21 in the northern part of the site (PNNL-13652, 2001). This trough is interpreted as part of a larger trough under the 200 East Area, resulting from scouring by the Missoula floods.

Hanford formation. The Hanford formation is as much as 116 meters (381 feet) thick in and around the IDF site. The Hanford formation thickens in the erosional channel cut into the Ringold Formation and thins to the southwest along the margin of the channel.

At the IDF site, the Hanford formation consists mainly of sand dominated facies and less amounts of silt dominated and gravel dominated facies. The Hanford formation has been described as poorly sorted pebble to boulder gravel and fine- to coarse-grained sand, with lesser amounts of interstitial and interbedded silt and clay. In previous studies of the site (WHC-MR-0391, 1991), the Hanford formation was described as consisting of three units: an upper and lower gravel facies and a sand facies between the two gravelly units. The upper gravel dominated facies appears to be thin or absent in the immediate area of the IDF site (PNNL-12257, 1999; PNNL-13652, 2001; PNNL-14029, 2002).

The lowermost part of the Hanford formation encountered in boreholes at the IDF site consists of the gravel-dominated facies. Drill core and cuttings from boreholes 299-E17-21, 299-E17-22, 299-E17-23, 299-E17-25, and 299-E24-21 indicate that the unit is a clast-supported pebble- to cobble-gravel with minor amounts of sand in the matrix. The cobbles and pebbles almost are exclusively basalt, with no cementation. This unit pinches out west of the IDF site and thickens to the east and northeast (Figure 3-4). The water table beneath the IDF site is located in the lower gravel unit. The lower gravel unit is interpreted to be Missoula flood gravels, deposited in the erosional channel carved into the underlying Ringold Formation.

The upper portion of the Hanford formation consists of at least 73 meters (240 feet) of fine-to coarse-grained sand, with minor amounts of silt and clay and some gravelly sands.

Holocene Deposits. Holocene, eolian deposits cover the southern part of the IDF site. Caliche coatings on the bottom of pebbles and cobbles in drill cores through this unit are typical of Holocene caliche development in the Columbia Basin. The southern part of the IDF site is capped by a stabilized sand dune. The eolian unit is composed of fine- to coarse-grained sands with abundant silt, as layers and as material mixed with the sand.

Clastic Dikes. A clastic dike was encountered in borehole C3828, adjacent to well 299-E17-25 at the IDF site. Clastic dikes also have been observed in excavations surrounding the site (e.g., U.S. Ecology, the former Grout area, the 216-BC cribs, the Central Landfill, and the Environmental Restoration Disposal Facility [PNNL, BHI-01103]). In undisturbed areas such as the IDF site, clastic dikes typically are not observed because these are covered by wind blown sediments. The occurrence of a clastic dike in borehole C3828 suggests that these probably are present elsewhere in the subsurface at the disposal site.

3.4.3 Seismology

The IDF will be located in Zone 2B, as identified in the UBC (DOE/RL-91-28). The analyses in Sections 5.1 and 5.12 provide additional seismic detail for design of liner and structural systems.

No active faults, or evidence of a fault that has had a displacement during Holocene times, have been found on the Hanford Site (DOE/RL-91-28). The youngest faults recognized on the Hanford Site occur on Gable Mountain, over 4.5 kilometers (2.78 miles) north of the 200 East Area. These faults are Quaternary of age and are considered 'capable' by the Nuclear Regulatory Commission (DOE/RL-91-28).

3.5 Hydrology

The following paragraphs briefly describe the known hydrology conditions of the Hanford Site and most specifically the 200 Area Plateau where the IDF site is located. These are prepared from information in the *ILAW Preliminary Closure Plan for the Disposal Facility* (RPP-6911).

3.5.1 Surface Water

The IDF site is within the 200 East area, which is on a plateau above the Columbia River. The Columbia River runs generally to the east and swings around the site, lying about 8 miles northwest and northeast of the 200 East area. The project area is significantly higher than the Columbia River and is not in the river's floodplain.

The soils in the project area are sandy with high rates of infiltration. Most of the precipitation falling on the site infiltrates into the ground, and there are no significant long-term surface water features in the project area.

3.5.2 Groundwater

The geologic structure of the 200 East area is composed of multiple layers of sediments that range from sand, silt, volcanic ash, and clay to coarse gravels, cobbles, and conglomerates that overlay thick layers of basaltic lava. An unconfined aquifer exists in the lower part of the sedimentary sequence, overlaying the uppermost basalt layer. This relatively thin aquifer intercepts infiltration from the unsaturated zone above it. The aquifer under the IDF site is approximately 90 to 100 meters (300 to 330 feet) below the ground surface. Therefore, the groundwater table is well below the proposed bottom of the excavation for the IDF and is not expected to influence the facility. The recharge of water into the ground at the IDF site is expected to be small. This condition results primarily from the low levels of annual precipitation that occur in the region of the IDF as well as the rest of the Hanford Site. A more detailed description of groundwater beneath the IDF, developed from various site explorations performed in the site area, is presented below.

The unconfined aquifer under the IDF site occurs in the fluvial gravels of the Ringold Formation and flood deposits of the Hanford formation.

The thickness of the aquifer ranges from about 70 meters (230 feet) at the southwest corner of the site to about 30 meters (98 feet) under the northeast corner of the IDF site. The Elephant Mountain Member of the Columbia River Basalt Group forms the base of the unconfined aquifer (Figure 3-3).

The unsaturated zone beneath the land surface at the IDF site is approximately 100 meters (328 feet) thick and consists of the Hanford formation. The water level in boreholes in and around the site indicates that the water table is in the lower gravel sequence of the Hanford formation and at an elevation of approximately 123 meters (404 feet) above sea level. The water table is nearly flat beneath the IDF site. Table 3-1 gives water level information from wells near the site. The locations of the wells are shown on Figure 3-1. The latest water table map shows less than about 0.1 meter (3.94 inches) of hydraulic head across the IDF site (PNNL-13404, 2001).

The Ringold Formation lower mud unit occurs within the aquifer at the southwest corner of the IDF site (299-E17-21) but is absent in the central and northern parts of the site (299-E24-7 and 299-E24-21). The lower mud unit is known to be a confining or partly confining layer at places under the Hanford Site (PNNL-12261, 2000), and this might be the case under the southwest corner of the IDF site. Groundwater samples were collected and analyzed from above and below the lower mud unit during drilling of well 299-E17-21. Chemical parameters (pH, electrical conductivity, and Eh) were different in the two samples, suggesting that the lower mud is at least partly confining in the area. No contamination was found above or below the lower mud. An interpretation of the distribution and thickness of this stratum is shown in Figure 3-4. The surface of the lower mud unit is interpreted to dip gently to the southwest (PNNL-13652, 2001).

Hydrographs for selected wells near the IDF site are shown in Figures 3-5 and 3-6. Hydrographs for the older wells (299-E23-1, 299-E23-2, and 299-E24-7) show two maxima in the water level. These coincide with the operation of the PUREX Plant that operated between 1956 and 1972 and between 1983 and 1988. All the hydrographs show a decline in the water table during recent years. The rate of decline is between 0.18 and 0.22 meters (7.08 and 8.66 inches)/year and will take between 10 and 30 years to stabilize. The reason for the decline is the cessation of effluent discharge to the PUREX Plant and to the 216-B Pond System, centered northeast of 200 East area. Based on hindcast water table maps (PNNL, BNWL-B-360), the water table is expected to decline another 2 to 7 meters (7 to 23 feet) before reaching pre-Hanford Site elevations. The cessations of effluent discharge also are responsible for changing the direction of groundwater flow across much of the 200 East area.

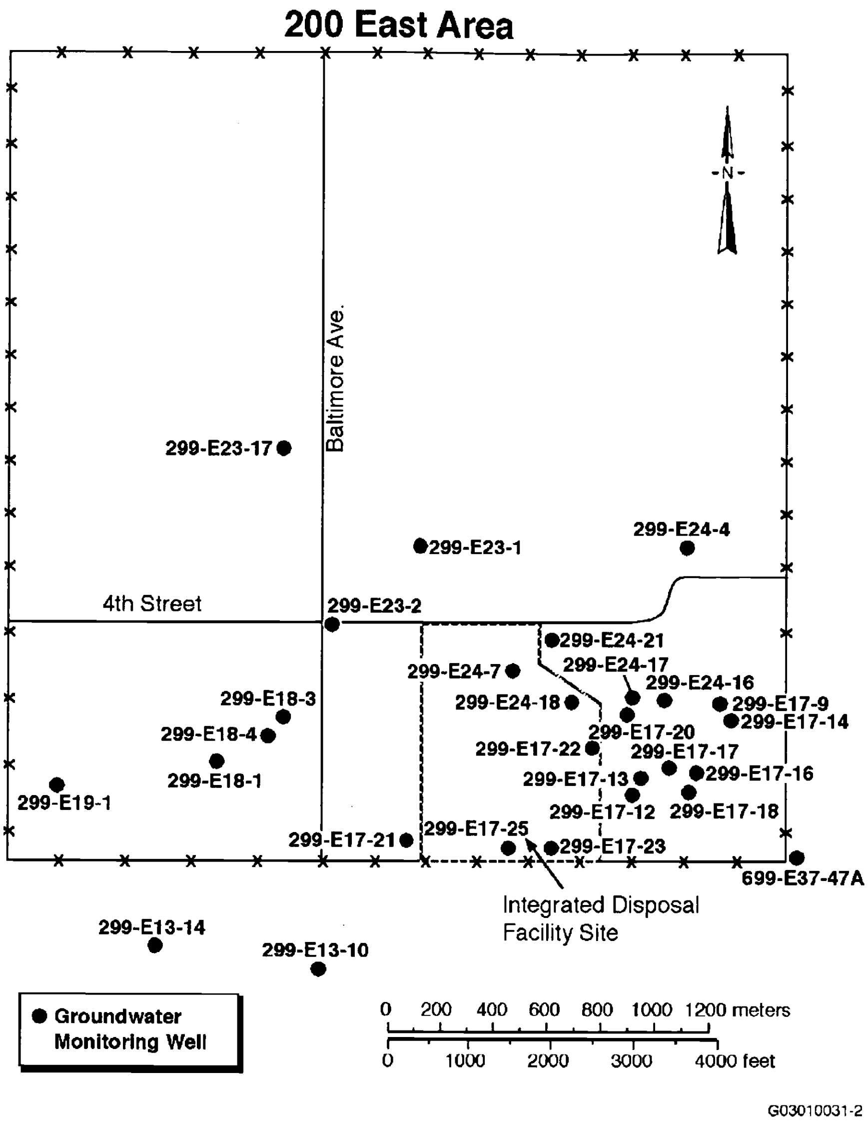
Groundwater flow beneath the IDF site recently was modeled to be southeasterly (PNNL-13400, 2000). This direction differs from the easterly direction, predicted by the analysis of WHC-SD-WM-RPT-241 and other earlier reports. The southeasterly flow direction primarily is attributable to inclusion of the highly permeable Hanford formation sediments in the ancestral Columbia River/Missoula flood channel in the analysis. A southeasterly flow direction is reflected in the geographic distribution of the regional nitrate and tritium plumes in the south-central 200 East area (Figure 3-7) (PNNL-13788, 2002.). As stated in PNNL-13404 (2001), the water table gradient is too low to be used for determining flow direction or flow rate at the PUREX Plant cribs, immediately east of the IDF site.

Hydraulic conductivity directly beneath the IDF site was estimated from data collected during four slug tests at well 299-E17-21 and five slug tests of 299-E24-21. The interval tested at 299-E17-21 was the upper 7.8 meters (26 feet) of the unconfined aquifer from 101.3 to 109.1 meters (332 to 358 feet) depth. That portion of the aquifer is Hanford formation gravel, from 101.3 to 102.1 meters (332 to 335 feet) depth, and Ringold Formation unit E gravels, from 102.1 to 109.1 meters (335 to 358 feet) depth (PNNL-12257, 1999). The interval tested at well 299-E24-21 was entirely in the Hanford formation gravel sequence between 95.2 and 101.3 meters (312 and 332 feet) depth. The best-fit value to the data from 299-E17-21 indicated a hydraulic conductivity of about 68.6 meters (225 feet) per day (PNNL-12257, 1999), and that from 299-E24-21 suggested a hydraulic conductivity of 75 meters (246 feet) per day (PNNL-13652, 2001).

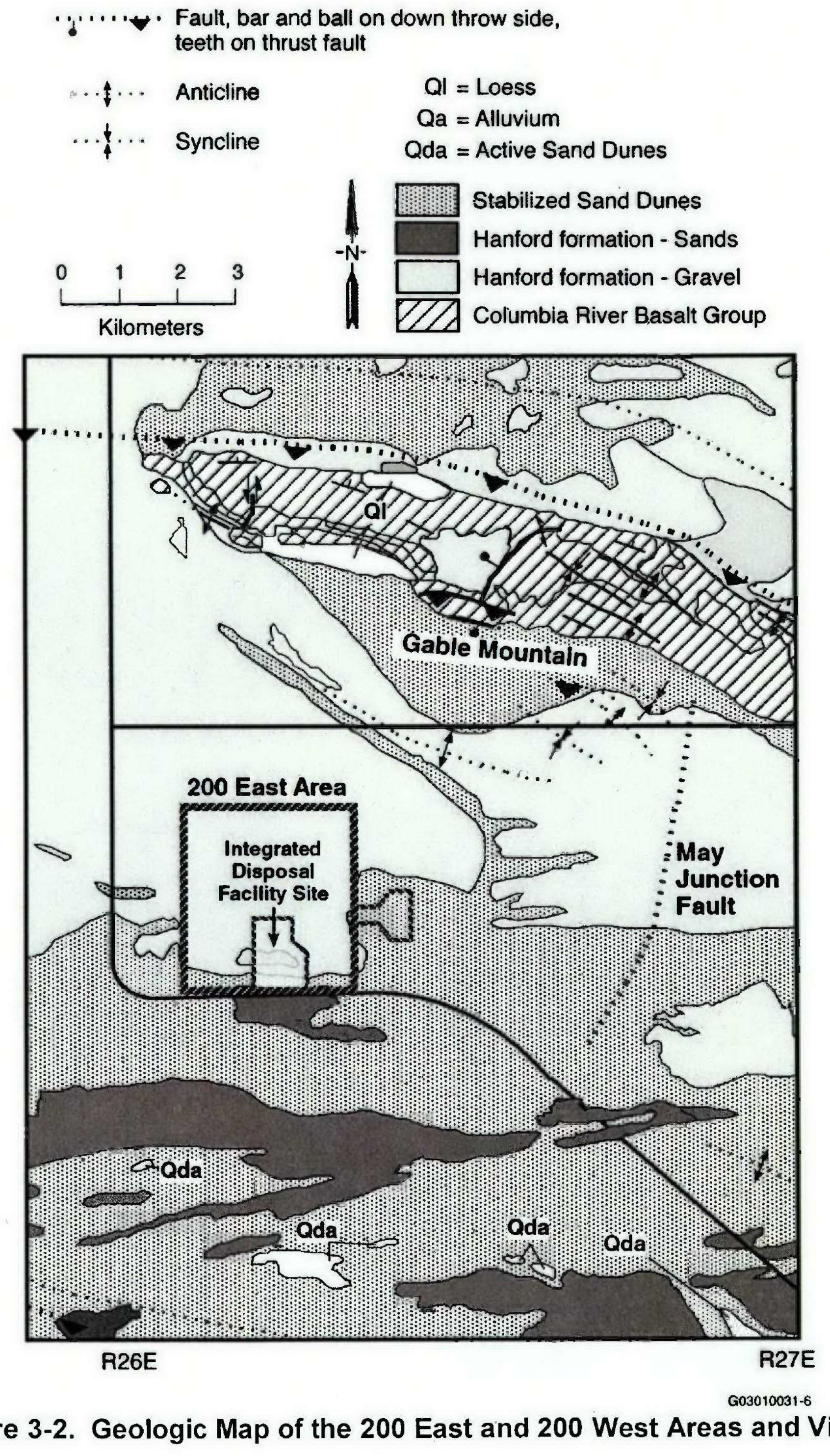
Table 3-1. Water Levels in Groundwater Wells in the Vicinity of the IDF Site

Well	Measure date	DTW m[a]	WT elev m[b]	Ref elev m[c]
299-E13-10	3/14/02	101.7	122.5	226.31
299-E17-12	3/14/02	100.0	121.1	221.09
299-E17-13	4/12/01	97.7	122.6	220.34
299-E17-17	4/12/99	97.8	122.8	220.54
299-E17-18	10/3/02	98.5	122.3	220.76
299-E17-20	4/9/97	97.1	123.2	220.33
299-E17-21	4/23/98	100.4	122.7	224.26
299-E17-22	5/20/02	98.1	122.5	220.59
299-E17-23	5/20/02	101.6	122.2	223.84
299-E17-25	5/21/02	98.3	126.7	225.03
299-E18-1	3/14/02	98.2	122.4	220.65
299-E18-3	6/27/96	97.8	123.4	221.20
299-E18-4	6/27/96	97.7	123.4	221.05
299-E19-1	3/22/88	100.4	124.9	225.26
299-E23-1	3/14/02	96.0	122.4	218.39
299-E23-2	12/20/94	97.2	123.5	220.77
299-E24-4	8/10/98	90.6	122.9	213.47
299-E24-7	6/11/97	96.2	123.2	219.34
299-E24-16	10/4/02	97.7	122.3	220.02
299-E24-17	4/7/97	97.36	122.9	220.16
299-E24-18	10/2/02	98.0	122.3	220.35
299-E24-21	3/22/01	95.4	122.6	217.85

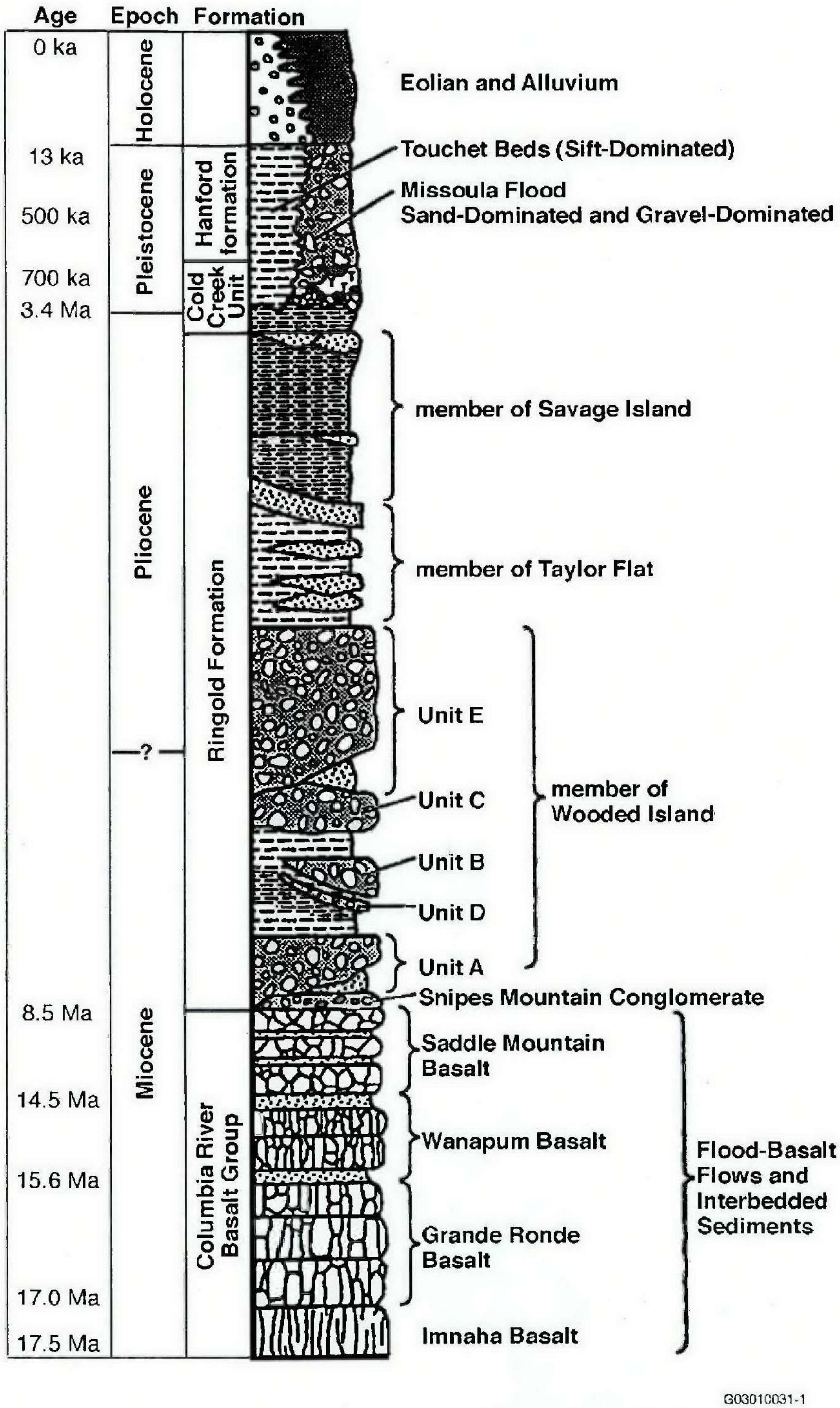
a DTW = depth to water
b WT elev = elevation of water table (meters above mean sea level)
c Ref elev = reference elevation (meters above mean sea level, North American Vertical Datam 88 reference), generally top of well casing.



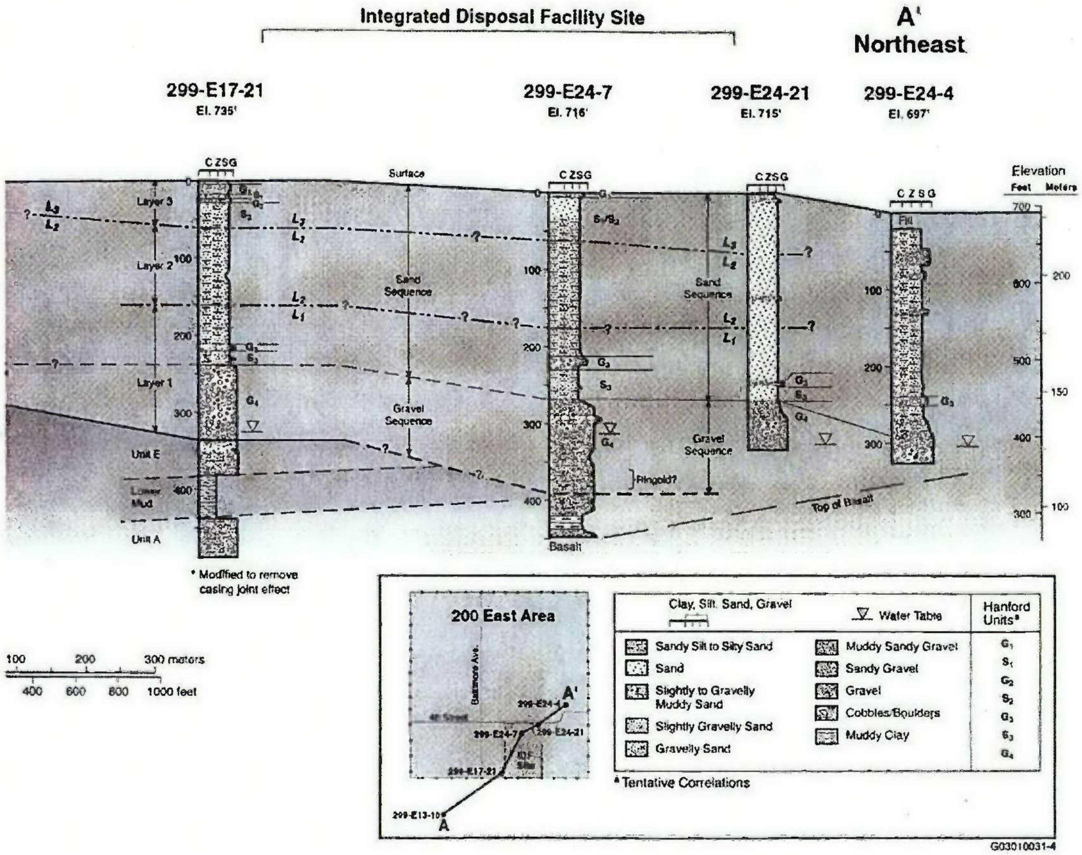
1 **Figure 3-1. Location of the IDF and Nearby Boreholes**



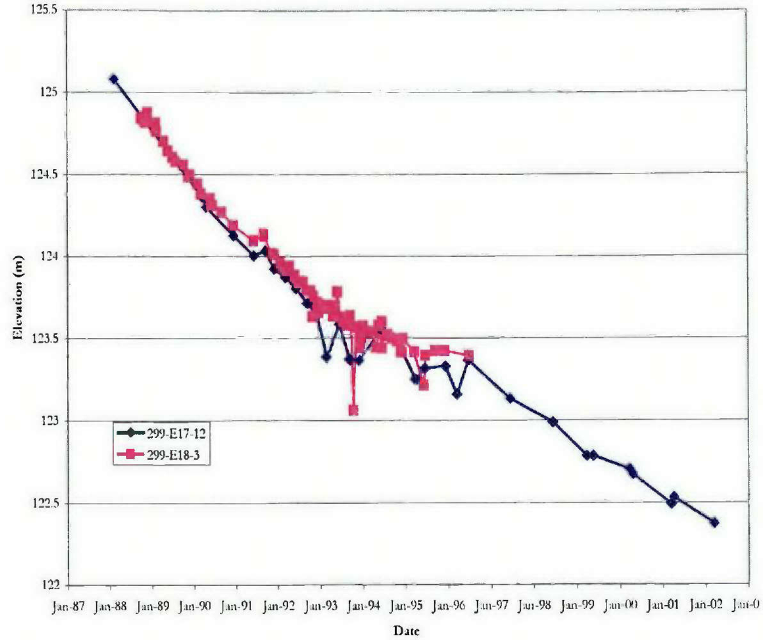
1 **Figure 3-2. Geologic Map of the 200 East and 200 West Areas and Vicinity**

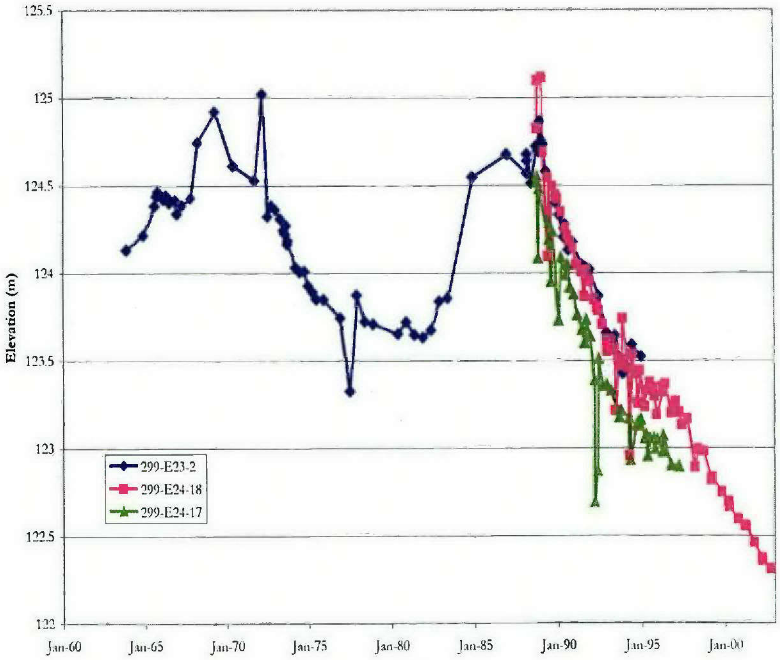


1 **Figure 3-3. Stratigraphy of the Hanford Site**



1 **Figure 3-4. Cross-section through the IDF Site (refer to Figure 3-1 for boring**
2 **exploration locations)**





1 **Figure 3-5. Hydrographs for Wells Near the IDF Site (1 and 2 of 3)**

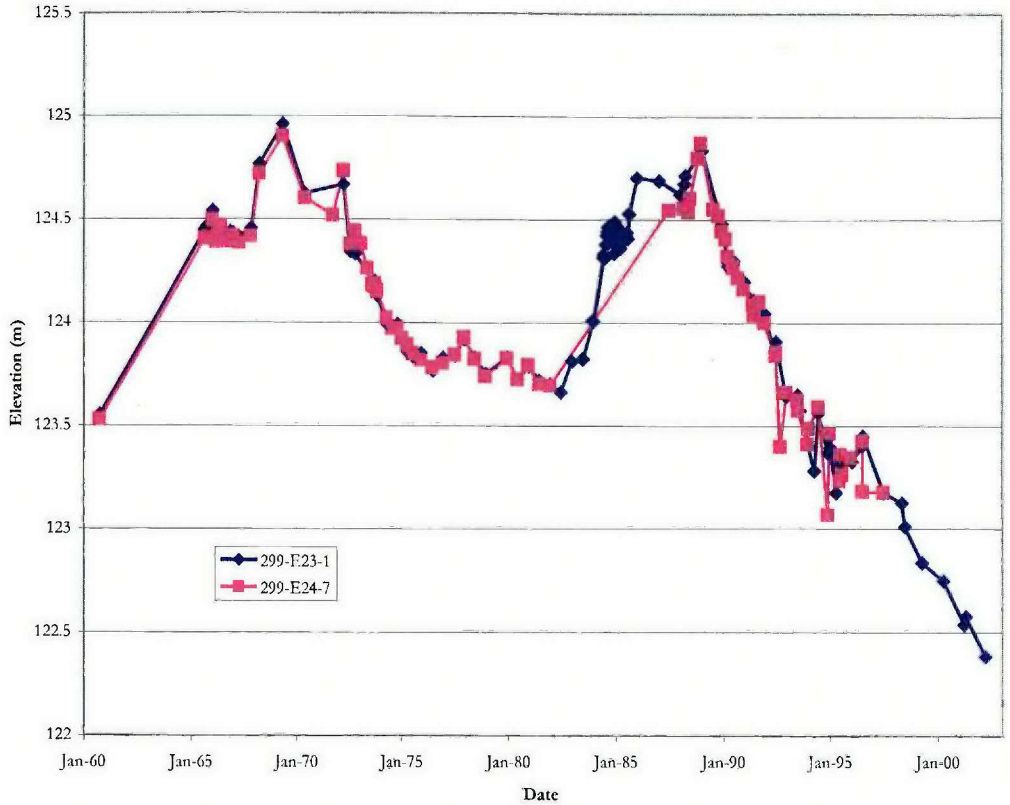
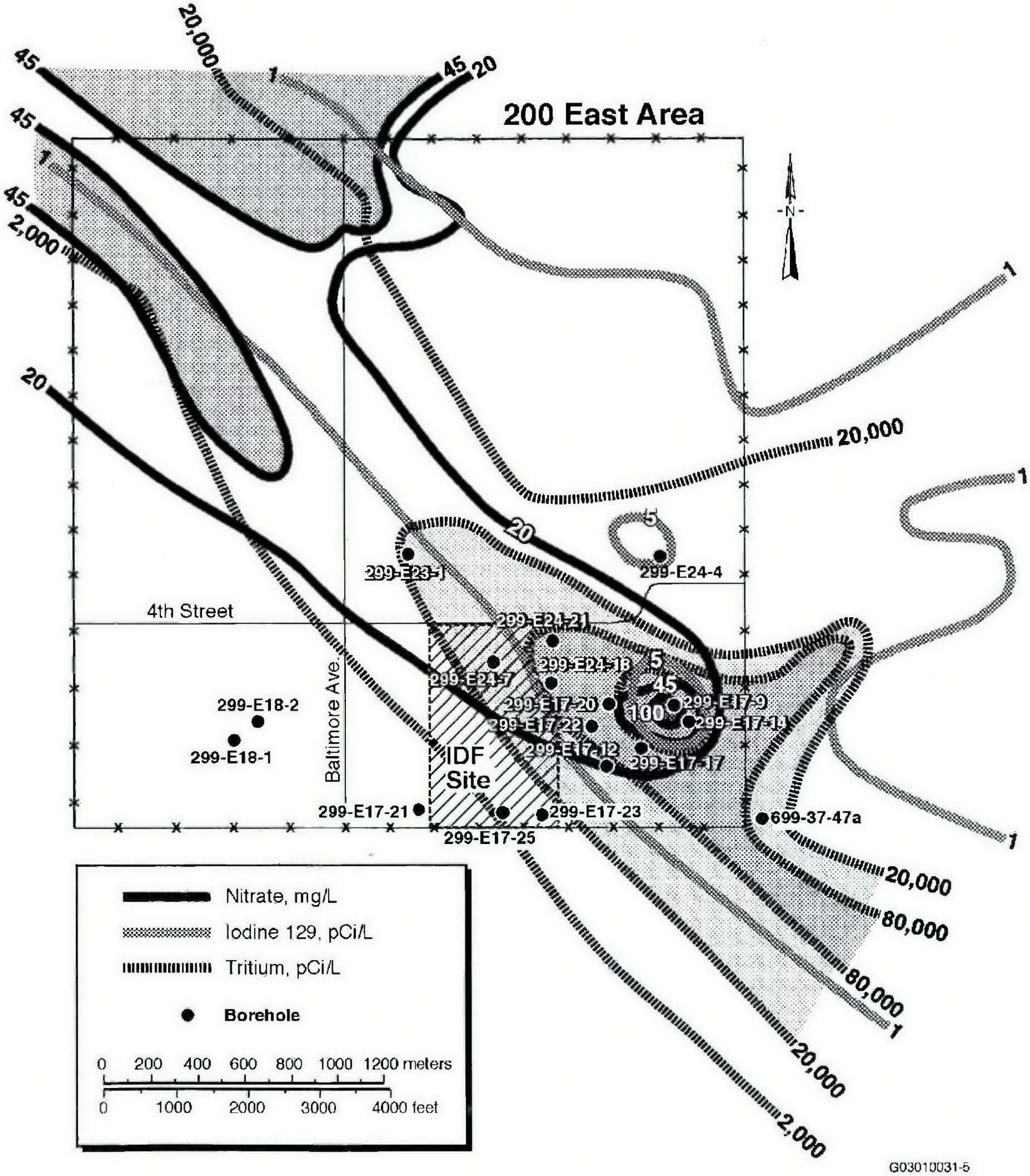


Figure 3-6. Hydrographs for Wells Near the IDF Site (3 of 3)



1 **Figure 3-7. Contaminant Plume Map for the 200 East Area**

4.0 SITE INVESTIGATION AND LABORATORY TEST PROGRAM

This section presents a summary of the existing, current, and planned explorations for the IDF, along with the laboratory test results for tests conducted during this design effort.

4.1 Field Explorations

This section discusses the existing and current soil explorations for the IDF. The generalized soil profile used in the analysis and design is presented; the engineering soil properties used for design are presented and discussed in Section 5 and related appendices.

4.1.1 Existing Explorations

Several field explorations have been conducted in the general area of the IDF, as discussed in Section 3.4.1 and presented in Figure 3-1. Figure 1-2 shows the current IDF footprint and the closest borings to the planned facility. As shown in Figure 1-2, with the exception of one boring, the existing explorations are all outside of the footprint of the IDF.

The existing field explorations at the IDF site have been conducted primarily for geologic and hydrogeologic characterization on a "big picture" scale. The existing explorations provide detailed information for the purposes for which they were conducted; however, from a geotechnical engineering perspective, the existing borings at or near the IDF site provides only general information, as discussed below.

Depth of Interest–In many cases, the explorations focused on providing detailed information for the entire soil column above the bedrock at the IDF site (300 or more feet below ground surface [bgs]). The primary depth of interest for detailed engineering and design purposes is the depth of the planned cell excavation (roughly 50 feet below the existing ground surface); for a few analyses, information about the material 25 to 50 feet below the base of the excavation is also important.

Type of Information–As intended, the existing explorations was generally focused on providing information for geologic characterization purposes. This focus differs from the key items generally required for geotechnical design, including Standard Penetration Testing (SPT) per ASTM requirements and classification by the Unified Soil Classification System (USCS) in both the field and the laboratory. For coarse-grained soils (sands and gravels), that make up the bulk of the native soil profile, *in situ* SPT in conjunction with grain-size data is the primary basis for determining geotechnical engineering parameters of the soil, such as shear strength. In all cases the SPT values were either not readily available or were conducted with non-standard equipment. Also, the existing grain size data and soil classifications, both for field and laboratory results were based on the Wentworth scale, which differs from the USCS scale at the gravel and fines divisions. These are the key division points for classifying coarse-grained soils. In particular, the break point for fines contents is important in determining the suitability of the excavated soils for use in the admix liner as well as for other on-site filling purposes. Many of the soils within the depth of interest for the IDF are near this classification break point.

Proximity to the IDF–As shown in Figure 1-2, in nearly all cases the explorations were located outside of the IDF footprint. The standard of practice for geotechnical engineering is to place explorations within or very close to the footprint of the proposed structure, if possible.

There have been several geotechnically focused explorations conducted for various projects at Hanford. The projects closest and/or most applicable to the IDF site are:

The Grout Vault project, located approximately one-half mile east of the IDF site (Dames and Moore, 1988).

The W-025 Project, a radioactive mixed-waste land disposal facility designed in accordance with RCRA Subtitle C design criteria, located several miles west of the IDF site (in Area 200W, Golder Associates, 1995, 1994a, 1994b, and 1988).

The RPP-WTP, location approximately 1 mile east of the IDF site (Shannon and Wilson, 2000 and 2001).

These projects all provide geotechnical engineering information; however, the closest site is one-half-mile from the IDF. The standard of care for geotechnical engineering is to either use existing geotechnically based information that is at the site and/or conduct site and project specific explorations. This is to verify that the soil conditions at the site are either still valid (no changes since the time of the existing explorations) or are consistent with existing data.

4.1.2 Current Explorations

Due to the limits of the geotechnical specific data, a subsurface exploration plan specific to the Phase I portion of the IDF was proposed. The suggested locations for the exploration are shown in Figure 1-2. This exploration is currently in planning.

During this design effort, a limited surface sampling plan was conducted at the locations shown in Figure 1-2. The surface samples were taken from the upper 2 to 3 feet of soil, primarily to provide samples for admix testing (to determine if the soils were suitable as a base soil), as well as to help fill in for the absence of a full exploration program at the time of this design effort. As shown in Figure 1-2, samples were taken from primarily from the dune sand borrow area within the IDF footprint (SD-1 through SD-4) and the active sand borrow area (SD-5) to the east of the IDF footprint. One surface sample (SD-6) was obtained from within the IDF Phase I limits.

4.1.3 Site Stratigraphy

In the absence of a comprehensive site and project specific geotechnical engineering data, the existing and current data discussed above was reviewed to determine appropriate soil profile and geotechnical parameters for use in engineering analysis and design. The stratigraphy and soil properties were generally selected conservatively to account for the uncertainty in the subsurface information. The general soil stratigraphy beneath the Phase I section of the IDF was assumed to be:

- 10 feet of Dune (Eolian) sand, overlying
- 50 feet of Upper Hanford sand, overlying

Lower Hanford sand to depth of interest.

It is expected that a greater depth of Dune sand exists in the southern portion of the IDF footprint (note topographic change in the southern one-third of the IDF footprint in Figure 1-2).

The engineering properties and parameters assumed for these soil units were based on the information provided in the geotechnical reports listed in the previous section. The individual values are discussed in Section 5 and related appendices.

4.1.4 Future Explorations

It is recommended that a comprehensive, geotechnically focused exploration program be completed, prior to construction, to verify that the assumptions made for soil stratigraphy and engineering properties are valid. A more comprehensive set of explorations is currently being planned. The planned locations for the additional explorations are shown in Figure 1-2, and include three explorations within the Phase I footprint and one exploration in the proposed sand borrow area.

4.2 Laboratory Testing

A limited laboratory testing program was conducted, using the soils collected during the surface sampling program discussed in Section 4.1.3. These samples were used to perform the index testing, admix testing, and geosynthetics interface shear testing.

4.2.1 Index Testing

Index testing was performed to evaluate the basic index and classification properties of the soil obtained from surface sampling program. This testing was conducted to provide data for comparison with both the soils used for the W025 admix liner and also for other soils that are considered for use as the base soil for the IDF project, as the final design and construction proceeds.

The laboratory testing was conducted by Soil Technology, Inc., (STI) of Bainbridge Island, Washington, under subcontract to the Affiliate. Test assignment and coordination was provided by the Affiliate. Index testing included the following ASTM tests:

- ASTM D422 – Test Method for Particle-Size Analysis of Soils (grain size and hydrometer analyses)
- ASTM D698 – Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
- ASTM D1140 – Test Method for Amount of Material in Soils Finer then the No. 200 Sieve (P200 Wash)
- ASTM D1557 – Test Method for Laboratory Compaction Characteristics of Soil Using Modified Efforts
- ASTM D2216 – Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock
- Compaction characteristics were also determined for a composite of the surface soils, as described in the next section.

4.2.2 Admix Testing Program

The admix testing program was developed to determine two key items:

- Percentage of sodium bentonite required to meet hydraulic conductivity requirements
- Appropriate moisture and density parameters to achieve the required hydraulic conductivity

Index testing of the admix soils was also conducted, as well as a consolidation test. The laboratory testing was conducted by STI. Tests were run in general accordance with the following:

- ASTM D422 – Test Method for Particle-Size Analysis of Soils (grain size and hydrometer analyses)
- ASTM D698B – Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
- ASTM D1557 – Test Method for Laboratory Compaction Characteristics of Soil Using Modified Efforts
- ASTM D2216 – Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock
- ASTM D2435 – Test Method for One-dimensional Consolidation Properties of Soils
- ASTM D4318 – Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)
- ASTM D5084 – Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

The base soil for the admix testing was created by compositing SD-1 through SD-4 from the surface sampling program. This composite did not include SD-5, taken at the base of the existing sand borrow area (lower elevation than the other samples) that has slightly different properties than the remainder of the surface samples. SD-6 was not included at the time of the admix testing because it is not within the footprint of the planned borrow area. The base composite sample was labeled as COMP-1. This composite was then used to create the two other soils for admix testing:

- COMP-2: COMP-1 base soil mixed with 8 percent bentonite
- COMP-3: COMP-1 base soil mixed with 12 percent bentonite
- Moisture and density testing was conducted on all of the composite samples.

The initial hydraulic conductivity testing was conducted using eight and 12 percent bentonite (by weight), based on the results of the admix testing program conducted by Golder for the W025 Project (Golder, 1991b). The target laboratory hydraulic conductivity was less than 10-8 cm/sec when permeated with water. Testing was not conducted with leachate, as no actual leachate exists for the planned waste at this time. Golder Associates used a synthetic leachate to perform compatibility testing on the admix liner. Based on these results, they increased the bentonite percentage from 8 to 12 percent, hence the use of these values in these tests. Because the base soils are expected to be similar to that used by Golder for the W025 landfill, and until a more refined characterization of the IDF leachate is developed, the compatibility testing performed for the W025 project was considered applicable to the IDF project. Hydraulic conductivity testing was performed on all samples in flexible wall triaxial cells with backpressure saturation, in general accordance with ASTM D5084. An effective confining stress of 5 pounds per square in (psi) was applied to each test cell. Appendix B.1 includes the details for the test, including the inflow and outflow data used to confirm that each test had obtained a steady-state hydraulic conductivity value.

After the initial hydraulic conductivity testing was completed, additional samples were set up to determine the range of moisture and density parameters that are expected to produce the required hydraulic conductivity in the field.

As noted above, the samples used for the testing were gathered from the surface sampling program. Once a more comprehensive exploration program is conducted within the IDF footprint, the suitability of the soils within the excavation below a depth of 5 feet (upper 2-3 feet) can be examined for use as a base soil for the admix.

4.2.3 Geosynthetics Interface Shear Testing

A limited soil-to-geosynthetic interface shear testing program was conducted to determine the interface shear values between the operations soil and the composite drainage net (CDN), and the admix liner soils and the high-density polyethylene (HDPE). These interfaces are site specific because of the unique nature of the soils, hence their behavior in interface shear. The testing was conducted by Precision Geotechnical Laboratories in Anaheim, California. Soil samples collected during the surface sampling program were used for testing; GSE Lining Technologies, Inc. based in Houston, Texas provided the geosynthetics for testing.

The interface shear tests were conducted in general accordance with ASTM D5321–Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method. The tests were conducted for both low (100 to 500 psf) and high (1000 to 8000 psf) normal stress levels, to account for the variation in normal stresses that will be applied across the lining system in the final landfill configuration. Both the peak and residual strength values were determined during testing. Additional details for the tests are presented with the test results in Appendix B.2.

Asperity testing was also conducted on the textured HDPE geomembrane, in general accordance with GRI-GM12 – *Asperity Height of Textured Geomembrane*. The purpose of the asperity testing was to establish a baseline roughness of the texturing of the HDPE geomembrane and for future assessments of the interface shear strength of other textured HDPE geomembrane products (e.g., from other manufacturers).

Site-specific interface shear testing was not conducted for geosynthetic-to-geosynthetic (such as CDN to geosynthetic clay liner [GCL]) interfaces in this phase of design, as these values are primarily a function of the manufactured product properties. A database of values for geosynthetic-to-geosynthetic interface testing was used to determine the appropriate interface shear values for design. During construction, the actual materials used on the site will be tested as part of the construction QC/QA, to ensure that the installed materials used onsite meet or exceed the interface shear strength values used in the design.

4.3 Laboratory Test Results

The results of the laboratory testing programs are summarized below and presented in Appendix B.1 and Appendix B.2.

4.3.1 Index Testing

The results of the index testing for the surface samples are presented in Table 4-1. The test results are included with the admix liner soils test results in Appendix B.1. Results of the index testing indicate that the grain size analyses for near-surface soil samples from locations SD-1 through SD-6 correlate well with data from the W025 base soil material. The W025 base soil was a dune sand (Eolian deposits) obtained from the upper 15 feet of site excavations. As discussed in Section 5.4, based on the results shown below and due to the limited nature of the near surface soil samples, the base soil is limited to the upper 5 feet of material excavated from the dune sand borrow area or the Phase I site excavation.

Table 4-1. Results of the Base Soil Index Testing

Test	Sample #	% Gravel	% Sand	% Fines	OMC, w_{opt} (%)	MDD, □$_{dmax}$ (pcf)
Grain Size Testing	SD#1			22.5	--	--
	SD#2		72.2	27.8	--	--
	SD#3			17.5	--	--
	SD#4		78.1	21.9	--	--
	SD#5	2.4	58.5	39.1	--	--
	SD#6		79.5	20.5	--	--
Standard Compaction	SD#6	--	--	--	14	106.6

OMC = optimum moisture content
MDD = maximum dry density

4.3.2 Admix Liner Soils Test Results

The results of the testing program conducted on the admix liner soils are summarized in Tables 4-2 and 4-3 and presented in detail in Appendix B.1. The associated placement and testing requirements during construction are also discussed in detail in Section 5.4.

Table 4-2. Results of the Admix Hydraulic Conductivity Testing

Sample ID	OMC (%)	MDD (pcf)	Remolded MC (%)	Remolded Wet Density (pcf)	Relative Compaction (%)	Saturated Hydraulic Conductivity (cm/sec)[a]	Gradient
COMP2-1	12.8[b]	117.2[b]	13.5	127	95	$2x10^{-8}$	11
COMP2-2	12.8[b]	117.2[b]	17.7	123	89	$4x10^{-8}$	10
COMP3-1	13.0[b]	115.5[b]	13.2	124	95	$<1x10^{-8}$	10
COMP3-2	13.0[b]	115.5[b]	17.4	122	90	$<1x10^{-8}$	10
COMP3-3	10.0[c]	126.3[c]	10.3	136	98	$<1x10^{-8}$	12
COMP3-4	10.0[c]	126.3[c]	14.2	139	96	$<1x10^{-8}$	10
COMP3-5	10.0[c]	126.3[c]	8	130	95	$<1x10^{-8}$	18

Table 4-2. Results of the Admix Hydraulic Conductivity Testing

Sample ID	OMC (%)	MDD (pcf)	Remolded MC (%)	Remolded Wet Density (pcf)	Relative Compaction (%)	Saturated Hydraulic Conductivity (cm/sec)[a]	Gradient
COMP3-6	13.0[b]	115.5[b]	10	115	91	1x10^{-8}	21
COMP3-7	10.0[c]	126.3[c]	10	123	89	<1x10^{-8}	20
COMP3-8	13.0[b]	115.5[b]	11	119	93	<1x10^{-8}	16

Abbreviations: OMC = optimum moisture content MDD = maximum dry density pcf = pounds per cubic foot
MC = moisture content
COMP 2 samples had 8 percent bentonite.
COMP-3 samples had 12 percent bentonite.
Average saturated hydraulic conductivity using tap water
Based on standard Proctor compaction curve (D698).
Based on modified Proctor compaction curve (D1557)

Table 4-3. Results of Admix Liner Soils Index Testing

Test	Sample #	% Gravel	% Sand	% Fines	LL (%)	PI (%)
Grain Size Testing	COMP-1	--	77.5	22.5	--	--
	COMP-2	--	70.6	29.4	--	--
	COMP-3	--	68.7	31.3	--	--
Atterberg Limits	COMP-2	--	--	--	40	17
	COMP-3	--	--	--	54	32

LL = Liquid Limit
PI = Plasticity Index

Consolidation testing conducted on the admix liner soils is presented with the rest of the results in Appendix B.1. This results of this test were used for the settlement analysis discussed in Section 5.3.1.

4.3.3 Geosynthetics Interface Shear Tests

The results of the geosynthetic testing program are presented in Table 4-4; the results of the asperity are shown in Appendix B.2. The results are discussed in detail in Sections 5.1.1 and 5.1.3, and their related appendices (Appendix C.1.a and C.1.c, respectively).

Table 4-4. Summary of Geosynthetic Testing

	Test	Peak Friction Angle (°)	Peak Cohesion (psf)	Residual Friction Angle (°)	Residual Cohesion (psf)	Asperity	Comments
Low	Operations Soil-CDN Interface	29.6	205.9	24.6	205.4	--	– Test #1 – dry density = 92 pcf – w_c = 8.7%

Table 4-4. Summary of Geosynthetic Testing

	Test	Peak Friction Angle (°)	Peak Cohesion (psf)	Residual Friction Angle (°)	Residual Cohesion (psf)	Asperity	Comments
	Admix Soil-HDPE Interface	33.3	94.4	33.5	56.8	--	– Test #3 – dry density = 110 pcf – w_c = 14%
High Normal Stress	Operations Soil-CDN Interface	28.3	283.9	28	240.8	--	– Test #2 – dry density = 92 pcf – w_c = 8.7%
High Normal Stress	Admix Soil-HDPE Interface	25.4	400.7	20.3	525.3	--	– Test #4 – dry density = 110 pcf – w_c = 14%
	Textured HDPE Asperity	--	--	--	--	23.5	Average value of two test results of 22 and 25.

As the final design progress and additional information is gathered for the admix soils and the operations soils, these results should be verified with additional testing. Testing during full scale construction is also planned to verify that the materials used in construction, both soils and geosynthetics, produce interface shear values at or greater than those used for design.

5.0 ENGINEERING ANALYSIS

This detailed Design Report finalizes the design for the landfill liner system, the leachate removal system, and the LDS. Engineering analysis components for each of these critical systems is presented in this section. A general description of system components is located in Section 5.6.1, that presents the primary and secondary liner systems that make up the major layers of the landfill (detailed system descriptions are presented in Section 6).

In preparation of the IDF design, a number of design requirements and criteria as presented in Section 2 have been considered. Compliance with these design requirements is provided in Appendix A. The specific criteria evaluated for the IDF design included:

- Slope stability
- Landfill bearing capacity
- Settlement and uplift analyses
- Admix liner
- Geosynthetic liner design
- Liner systems/leachate compatibility
- Drainage layer
- Leachate production
- Leachate collection system
- Surface stormwater
- Action leakage rate
- Building systems analyses
- Civil grading

5.1 Slope Stability

Slope stability for the IDF landfill was examined for liner veneer (side slope) stability, earthwork stability, waste/fill global stability. The analyses for each of these cases are summarized in the sections below; Appendices C.1.a through C.1.c presents the analyses and results in detail.

5.1.1 Liner Veneer (Side Slope) Stability

The veneer stability of the liner system on the side slopes was evaluated for the period prior to waste filling. The analysis examined the potential for sliding of the drainage and operations layers on the liner system before waste is placed.

The analyses were conducted using the weakest of the interface strengths of the various lining system components. The interface strengths were determined from regression analyses of data gathered from various sources, including site-specific test data completed to date. Based on the data (presented in Appendix C.1.a), the critical interface is the textured HDPE/CDN interface. Properties of the cover soil (operations layer) were determined from laboratory testing to date on the materials expected to be used for the operations layer.

Four loading conditions were examined:

- Dead load: self-weight of the lining system (including the first operations layer)
- Dead load + Equipment: self-weight of the lining system with an equipment load
- Dead load + Seepage: self-weight of the lining system with a seepage load (to account for fluid head in the leachate collection system); seepage loads were based on results from the leachate system hydraulic analyses
- Seismic Loading: self-weight of the lining system with seismic loading

The results of the analyses show that the lining system is stable for the conditions analyzed and no anchorage forces are required to meet the minimum factors of safety (1.5 for dead load only; 1.3 for equipment and seepage loading). A minimum interface friction of 25 degrees and cohesion of 0 psf is required to meet the minimum acceptable factors of safety. The slopes are also considered to be stable under seismic loading, based on comparing the calculated yield acceleration and with the design acceleration values provided in the design criteria by CH2M HILL (September, 2002), using the hazard classification assigned to the overall facility.

The critical interface friction values will be verified during construction to ensure that the system will be stable. The analyses and results are presented in full detail in Appendix C.1.a.

5.1.2 Earthwork Stability

The earthwork stability analysis covered the following three cases:

Excavation Case: This case covers the stability of the landfill slopes immediately after excavation and before placement of the lining system. Only static loading was considered since this is an interim configuration that will only exist for the construction period.

Ramp Case: This case covers the stability of the landfill slopes and access ramp at the south end of the cell, including equipment loading on the ramps. Both static and seismic loading were examined, as the access ramps are expected to be in use for a period of at least 10 years.

Dike Case: This case covers the stability of the perimeter dike (shine berm and access road) after construction of the dike and before final closure of the landfill. Both static and seismic loading were examined, since the perimeter dike may be in place until the final cover system is completed (greater than 10 years).

Properties for the native soils are based on existing information, as a site-specific geotechnical engineering investigation program has not yet been completed for the IDF facility. When this investigation is completed, the results of this analysis (and any others that rely on the properties of the native soils) will be verified. Geometry used in the analyses is based on the civil plans (generally 3H:1V slopes with a few short 2H:1V slopes).

The results of the analyses show that the planned configurations of the landfill are stable under static loading (factor of safety [FS] greater than 1.3 and 1.5, depending on the case analyzed); the configurations are also considered seismically stable based on the criteria for the Hanford site. Full details on the analysis method, the input data, and the results are presented in Appendix C.1.b.

5.1.3 Waste/Fill Global Stability

This analysis examined the following conditions:

Phase I Full Build-Out: This case examined the stability of the waste mass in full build-out of the Phase I waste cell. The critical stability examined was the waste sliding on the lining system. Both static and seismic loading conditions were examined.

Final Configuration: This case examined the stability of the waste mass at the final configuration (entire IDF landfill completed) along the edge of the cover system. Only static loading conditions were examined, since this system is not being designed as part of the current effort.

Interim filling conditions and the internal stability of the waste mass were not examined. The internal waste mass stability will primarily be a function of the filling methodology. Possible filling plans for the waste are currently being developed.

For the analysis of the full build-out of Phase I, the critical interface strengths in the lining system were determined in the same way as for the veneer stability (regression analyses of existing and site specific testing data). A combination of peak and residual strengths were used, based on methodology currently being employed in the state of the practice. A final check was also made to confirm that the use of residual strengths in all locations resulted in a factor of safety greater than 1.0.

The results show that the system is stable for the configurations analyzed and for the interface friction values available at the time of the analyses (FS greater than 1.5 in static loading and yield acceleration greater than the 10,000-year event). The system also has a FS greater than 1.0 for the case of residual strengths in all locations. The critical interfaces are the HDPE-CDN on the side slopes (using residual strengths) and the HDPE-GCL on the base liner (using peak strengths) and the internal GCL strength (using residual strengths). These results should be verified when additional site-specific test data becomes available prior to and during construction.

Also, it should be noted that for the full Phase I build-out configuration, the most critical case appears to be a failure surface that is allowed to propagate through the waste mass. As noted previously, the waste mass was considered internally stable for this design effort. During final operations planning, the internal stability of the waste will be examined in conjunction with the proposed waste filling plan.

For the final configuration with the cover in place, the preliminary geometry and assumed cover system properties show that the configuration is stable under static loading (FS greater than 1.5) and the critical failure does not intersect the waste mass. Stability of the final configuration under both static and seismic loading should be examined in more detail as the final design develops for the final closure of the entire IDF facility.

A full discussion of the methodology, input data, and the results is presented in Appendix C.1.c.

5.2 Landfill Bearing Capacity

5.2.1 Subgrade Soil

Based on the available geotechnical data from other projects (as discussed in Section 4), the strength of the native subgrade soils beneath the landfill is expected to be greater than that for the operations layer or any of the liner system components. Greater strengths equate to higher bearing capacities, and hence, the bearing capacity of the subgrade soils within the landfill cell was not determined directly as they are not the controlling factor.

The bearing capacity of the subgrade soils beneath the supporting structures adjacent to the landfill cell was determined for the structural analyses, discussed under Section 5.12.1–Geotechnical Design Parameters, and the results of the analyses are presented in Appendix C.11.a.

5.2.2 Liner Soils

The soil layers in the lining system include the operations layer, drain gravel, and the admix liner soils. The admix liner soils will be placed beneath the geosynthetic lining system, and as such, loading on the admix liner soils is limited to the allowable loads for the GCL. The allowable loads for the GCL are much less than what the bearing capacity of the admix liner soils would be (the admix soils have much higher strengths, particularly for bearing pressures). The drain gravel will be placed just above the lining system; the shear strength and associated bearing capacity are also much greater than the GCL allowable values.

At the time of these calculations, structures that would cause bearing pressure were not yet determined. Hence, the bearing capacity for the operations soils was calculated for foundation widths from 1 to 10 feet and for 2 different shapes (square and strip). Properties for the operations soils were based on laboratory testing conducted to date; these properties will be verified during construction to ensure that the analyses results are valid.

For a factor of safety of 3, the allowable bearing capacities for the operations layer are presented in Table 5-1.

Table 5-1. Operations Soil Bearing Capacities

B, Foundation Width (feet)	q_{all}, square foundation (tsf)	q_{all}, strip foundation (tsf)
1	0.20	0.33
5	1.0	1.6
10	2.0	3.3

As the operations plans are further developed, these values can be updated for the planned structures (such as barrier walls). Details of the analyses are presented in Appendix C.2.

5.3 Settlement and Uplift Analyses

5.3.1 Settlement Analysis of Liner Foundation

The long term settlement of the soils supporting the geosynthetic liner system was estimated based on the maximum loading expected in the landfill at the final IDF completion. The two soil units examined were the admix liner soils and the native subgrade soils. For the admix soils, data from laboratory consolidation testing performed on samples available at the time of the analysis were used to determine the estimated settlements. Elastic methods were used to estimate the settlements of the subgrade soils.

As detailed in Appendix C.3, the estimated long term settlement over the lifetime of the landfill is 2.7 feet under the maximum loading.

5.3.2 Subsidence and Sinkhole Potential

Subsidence of undisturbed foundation materials is generally the result of dissolution, fluid extraction (water or petroleum), or mining. Subsidence is not expected to occur based on the following:

- The soils underlying the IDF are generally dense, coarse-grained, and well-graded sands and gravels that will not be subject to piping effects that could transport soil and result in subsidence. Also, sands and gravels are generally not susceptible to dissolution.
- The groundwater level is deep and will not affect bearing soils.
- The bedrock is basalt (volcanic), which is not generally susceptible to dissolution.
- No mining or tunneling has been reported in the areas beneath or surrounding the site for the IDF.

- Borings in and around the IDF have not identified any soluble materials in the foundation soils or underlying sediments. Consequently, the potential for any sinkhole development will be negligible.

5.3.3 Uplift Potential

The potential for uplift of the composite liner system is very low. The seasonal high-water level is over 200 feet below the base of the base of the landfill cell, so no external hydrostatic pressure is expected from this source. Perched groundwater is not expected to occur due to the absence of continuous aquitards (such as a clay layer) within the coarse-grained native soils at the IDF site. Any infiltration that does occur is expected to percolate rapidly to deeper soil layers.

Gas pressures are also expected to be negligible, as no gas-generating material (i.e., organic material) is expected in the foundation soils. Also, the subgrade soils are coarse grained and unsaturated, so any gas that might occur is expected to be rapidly dissipated.

5.4 Admix Liner

5.4.1 Mix Design

WAC 173-303-665(2)(h)(i)(B) requires that the lower component of a composite bottom liner be constructed of compacted soil material with an in-situ hydraulic conductivity no greater than 10-7 cm/sec. Because of the lack of naturally occurring soils on-site that could achieve this requirement, a test program was developed to determine the admixture requirements for a mixed soil design using on-site base soil from either the Phase I excavation or dune sand borrow area (see Drawing H-2-830826 for location) and sodium bentonite. Details of the base soil field exploration and admix testing program are provided in Section 4.

The results of the limited field exploration for base soil samples and subsequent admix testing program discussed in Section 4 show that a nominal bentonite content of 12 percent will meet the laboratory target hydraulic conductivity of less than 10-8 cm/sec when permeated with water. The laboratory target was established based on results of the soil liner/leachate compatibility study (Golder Associates, 1991b) for the W025 landfill. Details of Golder's study are discussed in Section 5.6. The W025 study concluded that the bentonite content of the admix should be increased from 8 percent (the minimum bentonite percent needed to achieve the required hydraulic conductivity) to 12 percent, to provide adequate resistance against high inorganic concentrations in the synthetic leachate for the W025 project. Index laboratory testing on the limited field exploration at the IDF site (surface sampling) established that the base soil for the IDF was similar to the W-025 project, as discussed in Section 4. Thus, until a more refined characterization of the IDF leachate is developed, the compatibility testing from the W025 testing is applicable to the IDF mix design.

Once initial hydraulic testing confirmed that an admix with 12 percent bentonite content could achieve the laboratory target value, additional samples were set up to evaluate a range of moisture and density parameters and their effect on hydraulic conductivity. The additional hydraulic conductivity tests were performed to define moisture content-density requirements for a range of compactive energy, as outlined by Daniel and Benson (1990). This data was being used to develop an "acceptable" zone of moisture and density for use by QC personnel during construction. The acceptable zone for the 12 percent admix is presented along with the admix design laboratory test results in Appendix B.1.

The acceptable zone was developed based on samples that achieved a hydraulic conductivity of less than 10-8 cm/sec. A lower bound of 95 percent relative compaction, based on Standard Proctor (ASTM D698) compactive effort, was established to ensure adequate shear strength levels. As indicated in the technical specifications (see Section 02666), the moisture-density range of the compacted admixes shall lie within a trapezoidal-shaped field with the following corners:

Moisture Content (%)	Dry Density (pcf)
8	126
14	126
12	110
19	110

Note that the minimum dry density of 110 listed above corresponds to approximately 95 percent of the maximum dry density for admix, as measured by ASTM D698.

5.4.2 Placement and Testing

The moisture-density requirements developed as part of the admix testing program will be included in the specifications for the admix liner (see discussion in Section 5.4.1, and technical specifications, Section 02666). The intent of the placement technical specifications is to help ensure that the admix liner will meet an in-place performance specification for hydraulic conductivity of less than 1x10-7 cm/sec. The contractor is responsible for developing and implementing compaction means and methods that will produce the required relative compaction.

The recommended nominal bentonite percentage (12 percent) and moisture-density parameters for the admix liner have been developed with a one order of magnitude factor of safety between laboratory and field values for hydraulic conductivity. The factor of safety is expected to account for two issues: (1) variations in the hydraulic conductivity between the laboratory soil amendment study and full-scale production, and (2) the laboratory samples were permeated with water rather than leachate, which could lead to a difference in the field hydraulic conductivity. However, factors such as base soil variability at the borrow source and field placement and construction are difficult to quantify until full-scale production begins for the admix liner. A test pad will be constructed as part the IDF construction to model the full-scale production. The purpose of the test pad is to determine acceptable processing, placement, and compaction methods that will produce a low-hydraulic conductivity admix liner with an *in situ* hydraulic conductivity of 10-7 cm/sec or less. The bentonite percentage and moisture content/density range may be modified if the preconstruction testing performed on the test pad indicates an *in situ* hydraulic conductivity greater than 10-7 cm/sec. Construction QA sampling and testing for the test pad is described in the Detailed Design Cell 1 Construction QA Plan (CH2M HILL, March 2004).

5.4.3 Freeze/Thaw

Compacted soil liners, such as the IDF admix liner, are known to be vulnerable to large increases in hydraulic conductivity due to freeze/thaw cycling; current data suggests that compacted soil bentonite admixtures may not be as vulnerable to damage as true clay liners (Kim and Daniel, 1992; Benson and Othman, 1993; Kraus et al., 1997). Existing laboratory data indicate that GCLs are less susceptible to damage from freeze/thaw conditions and therefore, do not undergo increases in hydraulic conductivity (Hewitt and Daniel, 1997; Kraus et al., 1997).

In order to provide adequate freeze/thaw protection for the admix liner and avoid potential damage to the GCL a protective soil cover can be used. The thickness of the protective soil cover should exceed the predicted freeze depth. For the IDF, protective soil cover is provided by the operations layer on the side slope (3 feet) and the drain gravel and operation layer (4 feet total) on the bottom liner.

The analysis was performed on the IDF lining system operations layer to determine the freeze depth or frost penetration for a probable freezing season during the 10-year expected period of waste filling.

Both a 10-year return period (90 percent probability on non-exceedance) and 20-year return period (95 percent probability on non-exceedance) air freeze index (AFI) were used to estimate maximum frost penetration depth in the operations layer. If the maximum frost penetration depth were less than the 3-foot minimum thickness operations layer over the lining system, the proposed operations layer thickness would be considered as adequate protection for exposure of the lining system to freeze-thaw cycles.

For the 10-year return AFI, the maximum freeze depth is estimated at 17 inches. For the 20-year return AFI, the maximum freeze depth is estimated at 21 inches. The maximum estimated freeze depths for both the 10-year and 20-year return period freezing seasons indicate that the proposed cover soil thicknesses provide more than adequate protection for the underlying admix liner and GCL from potential damage when subject to freeze-thaw cycles. Details of the freeze depth calculations are included in Appendix C.4.

5.5 Geosynthetic Liner Design

5.5.1 Geomembrane Liner Tension Caused By Thermal Contraction

The HDPE geomembrane for IDF lining system will be subject to temperature-induced tensile strain from expansion/contraction as the geomembrane is exposed to temperature fluctuation.

Strain on the liner was calculated using published values for the coefficient of linear thermal expansion for HDPE geomembrane (Koerner, 1998) and applying this to the maximum slope length. The maximum length is measured from the top of the slope, where liner is anchored, to the toe of the 3H:1V side slope. This is a conservative approach, as using the maximum slope length results in the maximum amount of expansion and strain on the liner. Additionally, a conservative temperature change of 40 degrees C (104 degrees F) was used in the analysis.

The maximum liner strain was estimated to be less than 0.5 percent, based on a maximum temperature change of 40 degrees C (104 degrees F). The estimated maximum of slack in the liner on the side slope is 8.6 inches. The corresponding amount of temperature induced stress is 566 psi. See Appendix C.5.a for supporting calculations.

As shown in the technical specifications, Section 02661 (Table 1), the elongation at yield for the geomembrane that will be used in the liner system is at least 12 percent, with a minimum tensile strength at yield of 2,000 psi. Therefore, the maximum anticipated strains are well below the yield tensile strain and stress for the HDPE geomembrane, and temperature-induced strain will have no adverse impact on lining system function.

It should be noted that temperature-induced strain is only applicable during the construction period when the HDPE geomembrane is exposed to temperature fluctuation. Once covered with 3 to 4 feet of cover soils (drain gravel and operations layer), the ambient temperature at the surface of the geomembrane will be more controlled and not subject to fluctuation.

During installation, care must be taken to allow for expansion/contraction of the HDPE geomembrane to minimize the development of wrinkles that could become future stress points under soil and waste loading. The technical specifications (see Section 02661) provide requirements for control of wrinkle development during liner deployment, including the limitation of working when the temperature is below 0 degrees C (32 degrees F) or above 40 degrees C (104 degrees F) without implementing installation procedures that address the environmental conditions.

5.5.2 Liner System Strain Due To Settlement

The barrier components (geomembrane and GCL) for the IDF lining system will be subject to settlement-induced tensile strains as the underlying soils, primarily the admix soil liner and the subgrade soil, settle over time. Strain within the lining system was calculated based on the results of the liner foundation settlement calculations (see Section 5.3 for settlement of foundation soil [subgrade] and admix liner).

The strain calculation assumed that all vertical settlement was translated into strain along the liner rather than just the vector component parallel to the liner. This is a conservative assumption that establishes an upper bound for liner strain.

The maximum liner strain was estimated to be less than 0.6 percent, based on a maximum estimate of 2.7 feet of settlement at the base of the lining system. See Appendix C.5.b for supporting calculations.

As shown the technical specification (Section 02661, Table 1), the elongation at yield for the geomembrane that will be used in the liner system is at least 12 percent. Based on studies of effect of differential settlement on GCLs (LaGatta et al., 1997), the limiting strain was defined as the strain in which an increase in hydraulic conductivity of the GCL was observed, which was taken as 5 percent.

Therefore, the maximum anticipated strains are well below the yield or limiting tensile strain for the barrier components of the lining system (geomembrane and GCL). Settlement-induced strain from foundation and admix soil settlement under maximum landfill content pressure will have no adverse impact on lining system function.

5.5.3 Anchor Trench Pullout Resistance

During construction, the geomembrane could experience pullout forces caused by thermal expansion/contraction or wind uplift. However, tension from thermal expansion and contraction is expected to be small (see Section 5.5.1), and the geosynthetics installer can use sand bags or other approved method to control wind uplift during installation.

After construction and placement of operation layer, the pullout forces on the geomembrane are expected to be negligible, as there is no tension force on the liner. As indicated in the veneer (side slope) stability analyses (see Section 5.1.1), the lining system interface strength exceeds the slope angle on the 3H:1V side slope. Thus, the pullout resistance requirements for the anchor trench are to support the self-weight of the geomembrane and other lining system components. Analyses for liner self-weight support requirements determined that the frictional resistance between geosynthetics exceeds the liner self-weight. Thus, no additional pullout resistance is needed at the anchor trench to support lining system self-weight.

Supporting calculations for the anchor trench design, as shown on Drawing H-2-830838, Detail 3, are included in Appendix C.5.c. Based on the calculations for the configuration shown in the drawing, a pullout resistance ranging from 1840 pound/foot (lb/ft) to 2440 lb/ft is estimated (depending on actual mobilized interface shear strength). The required minimum tensile yield strength for 60-mil HDPE geomembrane in the technical specifications (see Section 02661) is 1440 lb/ft (120 lb/in), which results in the estimated pullout resistance exceeding the geomembrane tensile yield strength. This situation is due primarily to the configuration of the shine berm, which helps to anchor the system. While it is generally not desired for the pullout resistance to exceed the yield strength, this is not expected to be a problem at the IDF, since, as discussed above, the potential causes for geomembrane tension have been addressed and there is not a scenario for mobilizing tensile or pullout forces on the lining system.

5.5.4 Puncture Resistance

The primary geomembrane in the IDF will be overlain by the LCRS. For the side slope lining system, the LCRS consists of a CDN (see Detail 2 on Drawing H-2-830838) that provides protection for the primary geomembrane from the overlying operations layer. A separate discussion of the CDN geotextile puncture resistance is provided in Section 5.7.2. For the bottom lining (floor) system, the LCRS consists of drain gravel overlying the geomembrane (see Detail 1 on Drawing H-2-830838). A geotextile cushion will be required between the drainage gravel and the geomembrane to prevent the gravel from puncturing the geomembrane. An analysis was performed to determine the weight of the geotextile fabric required to prevent geomembrane puncture either from operating equipment loads or from the combined static weight of the waste and final cover.

Koerner (1998) developed a method for estimating required geotextile thickness that considers the size and shape of the rock, as well as other factors that could decrease the long-term strength of the geomembrane. The equation used to determine puncture resistance is based on the mass per unit area of the geotextile and the protrusion height of the puncturing material.

Operating loads were estimated based on a melter transport trailer operating directly on the surface of the first operations layer. Static loads were estimated for the post-closure condition by using the weight of four layers of ILAW packages with cover soil and a 15-foot-thick closure cover, with a 2 percent grade to the center of the landfill. The static load was more than two times greater than the operating load, and therefore was used as the basis for the puncture analysis. Detail calculations for geomembrane puncture resistance and corresponding cushion geotextile requirements are included in Appendix C.5.d.

The proposed design specifies that the LCRS drainage gravel will have a gradation corresponding to WSDOT Standard Specification 9-03.12(4). This gradation has a maximum stone size of 1 inch. From the curves shown in the detailed calculations, the FS for a 12 oz/yd2 geotextile loaded by 1-inch angular rock is 4.5. For subrounded rock or gravel, this is more representative of the specified drain gravel, the FS increases to 8.9. The specified cushion geotextile (see technical specifications, Section 02371) has a nominal weight of 12 oz/sq yd, and therefore should be adequate to prevent geomembrane puncture. Koerner (1998) recommends a FS greater than 3.0 for the condition of packed stones on a geomembrane, such as would be the case for drain gravel over the geomembrane at the IDF.

5.5.5 Operational/Equipment Loading

The effects of loading on the GCL from construction and operational equipment and activities were examined. The maximum loads from the landfill waste itself were found to produce the highest loading on the geomembrane and the CDN; these materials were selected based on this maximum loading, as discussed in the previous sections.

The cases for construction equipment loading and operational loading on the GCL were examined, including the extreme loading case of the crane placing the heaviest waste loads at its maximum reach, a situation which produces very high pad loads. The expected loads were compared to the calculated allowable GCL bearing capacity to determine if the loads would have an effect on the GCL. The allowable GCL bearing capacity was determined from classical geotechnical theory and based on manufacturer's strength data.

The results of the analyses are presented in detail in Appendix C.5.e. For the construction loading, the analyses show that the specification requirements that limit construction loading are adequate to protect the GCL, based on the standard construction equipment anticipated to be used at the IDF and as examined in the calculations.

For the operational loading cases examined, the critical condition is the crane operating under an extreme condition. The minimum dunnage requirement for the crane pads is 60 square feet, or if square, a 7.7-foot by 7.7-foot dunnage pad. Lower loads will require less dunnage and can be calculated as detailed in Appendix C.5.e. As discussed in the appendix, dunnage requirements calculated in this way are appropriate as long as the lining system is functioning as intended (i.e., no moisture in the LDS). If moisture enters the LDS and the GCL becomes hydrated, the dunnage requirements will be increased by a factor of approximately 2.5.

It should also be noted that the primary purpose of the GCL in the IDF is not as a required lining system component (such as the geomembrane or the admix liner), but to "deflect" leachate from defects or pinholes in the primary geomembrane over the bottom area and longer-term storage areas (such as leachate sump trough), where the leachate head potential is greatest. The primary purpose of the primary GCL is to reduce the actual leakage rate into the LDS in the event of leak in the primary geomembrane. Given these considerations, the GCL should perform as intended under anticipated equipment and operational loading.

As the operations plans for the landfill are developed, loading values can be compared to the results shown in Appendix C.5.e to determine if the loads will affect the GCL.

5.6 Liner Systems/Leachate Compatibility

The purpose of this analysis is to demonstrate that the liner materials proposed for the IDF landfill are chemically compatible with the leachate. Certain materials deteriorate over time when exposed to chemicals that may be contained in hazardous leachate. It is important to anticipate the type and quality of the leachate that the landfill will generate and select compatible liner materials. Data collected from other similar low-level radioactive mixed waste and hazardous waste sites were used in conjunction with the anticipated IDF leachate concentrations to evaluate the allowable concentration of leachate constituents that could be in contact with the IDF landfill liner components.

5.6.1 Lining System Description

Detailed discussion of the lining system design elements is provided in Section 6. A summary is provided in this section to facilitate discussion with respect to the chemical and radiation resistance of the lining system components.

Drawing H-2-830838 (Detail 1) shows the bottom liner section consisting of the following components, from top to bottom:

- A 3-foot-thick operations layer
- A separation geotextile (polypropylene)
- A 1-foot-thick leachate gravel layer
- A minimum 12 oz/square yard cushion geotextile (polypropylene)
- A 60-mil (nominal thickness—see Section 6.3.2.1) textured primary HDPE geomembrane
- An internally-reinforced GCL
- A CDN drainage layer for primary leak detection/collection
- A 60-mil textured secondary HDPE geomembrane
- A 3-foot-thick low-hydraulic conductivity compacted admix (soil-bentonite) liner

For the bottom lining system, both the primary and secondary liners are a composite (geomembrane over admix liner or GCL) system. The addition of a GCL in the primary liner layer provides an extra measure of protection, exceeding the requirements of WAC 173-303-665(2)(h)(i), which stipulates a single geomembrane for the primary liner and composite for the secondary only. This will provide an extra measure of protection on the bottom flatter slopes of the IDF, where higher leachate head levels are more likely.

Drawing H-2-830838 (Detail 2) shows the side slope liner section consisting of the following components, from top to bottom:

- A 3-foot-thick operations layer
- A CDN drainage layer for primary leachate collection
- A 60-mil textured primary HDPE geomembrane
- A CDN drainage layer for primary leak detection/collection
- A 60-mil textured secondary HDPE geomembrane
- A 3-ft-thick low-hydraulic conductivity admix liner

The side slope lining system is a single geomembrane liner over a composite liner, meeting the requirements of WAC 173-303-665(2)(h)(i). The 3H:1V side slopes for the IDF will result in little or no leachate head build-up on the side slope lining system, thus eliminating the need for a lining system design that exceeds the WAC requirements.

In general, the liner system consists of two types of materials, geosynthetics and soil/bentonite mixtures (admix). The geomembranes, geotextiles, and CDN are manufactured from polymeric materials, such as HDPE, and polypropylene, made from synthetic polymers. The GCL consists of a bentonite layer sandwiched between two polypropylene geotextiles to assist in placement and construction. The admix liner is comprised mainly of silt to clay-sized particles, mixed with a silty sand base soil.

5.6.2 Leachate Characterization Assumptions

Several assumptions were made regarding the composition of the leachate concentrations and the applicability of previously conducted studies for this evaluation. Specifically, the studies considered directly applicable to this evaluation were:

- Geosynthetic and Soil Liner/Leachate Compatibility Studies for the W-025 Radioactive Mixed Waste Landfill in Hanford 200 West (Golder Associates, 1991a and 1991b; TRI, 1995; and WHC, 1995)
- Liner/Leachate Compatibility Study for the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory (INEEL) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Disposal Facility (ICDF) (DOE-ID, 2002).

Using these studies is considered appropriate for the following reasons:

- The leachate for the IDF is expected to have similar or lower concentrations of radionuclides than that used in the W025 facility study (since similar waste streams [other than ILAW] may be accepted).
- The leachate chemistry may be of similar composition to the W025 facility study (since similar waste streams [other than ILAW] may be accepted).
- Soils used in the W025 facility admix design are similar to those that will be used in the IDF admix design and will therefore be compatible.
- Similar technical specifications for the geosynthetics and admix liner used in the W025 facility design will be used in the IDF landfill design.
- A similar technical specification for a GCL used in the ICDF facility will be used in the IDF liner design.

5.6.2.1 Synthetic Leachate Concentrations for W-025 Landfill

The leachate generated for the W025 evaluation reflects both the waste materials and the stabilization agents used during waste preparation. Because the landfill will comply with waste acceptance criteria for WAC dangerous waste and RCRA facilities (as does the IDF), organic materials are not expected to be present in the waste after processing. The proposed geosynthetic materials are susceptible to damage from certain organic compounds but generally are not susceptible to damage from inorganic compounds, even with extreme pH values. As a result, the lack of organic materials results in a relatively benign leachate.

The source leachate generated for the W025 studies, was primarily based on the waste treatment and packaging approaches for W025. An aqueous solution of inorganic, with some organic compounds for conservative evaluation, was generated, resulting in a viscous, slurry-like mixture. This mixture was placed in a leaching column, and deionized water was introduced to simulate the effects of leachate generation. Although no organic components were anticipated in the waste, small quantities of benzene, methanol, and light machine oil were included to simulate the presence of organic compounds in the waste material.

The source leachate generated through the leachate column process was chemically analyzed with the following results:

- Concentrations of organics benzene and machine oil were below detection limits. Concentrations of methanol were detected, but at concentrations not considered aggressive for polyester or HDPE.
- Metals added to the waste were below the detection limits in the source leachate.
- Primary constituents of the source leachate were sodium cations and common inorganic anions, with a pH of 9.2.
- Based on these results, a synthetic leachate was generated for testing purposes. The source leachate formula resulted in a solution with total inorganics and dissolved salts of approximately 204,000 mg/L and pH of 9.2 using NaOH or HNO3, as required.

5.6.2.2 Simulated Irradiation Exposure for W-025 Landfill

Samples used to evaluate the effects of radiation were subjected to a 50,000-rad total dose of gamma radiation. This dose is expected to exceed the maximum level of radiation experienced by geosynthetic materials in the landfill under unfavorable conditions. Use of a total dose, rather than radiation type, is considered the primary factor causing damage to polymeric materials and is considered to adequately simulate actual IDF leachate conditions. Samples and leachate were irradiated together so that any synergistic effects would be seen. The following samples were included in the irradiation testing:

- Geomembrane
- Geotextile
- Geonet
- Admix (soil/bentonite mixture)

The synthetic leachate and radiation exposure developed from the W-025 studies were used as the basis of evaluation for the IDF lining system materials. Table 5-2 provides a comparison of the leachate concentrations for the W-025 project with other studies for which the U.S. Environmental Protection Agency (EPA) Test Method 9090 were performed on the lining system.

The ICDF project did not include EPA 9090 tests, however, a model for estimating leachate concentration based on the waste acceptance criteria for the project was developed. The maximum leachate concentrations and radiation exposure developed for the ICDF (DOE-ID, 2002) based on the anticipated waste design inventory were as follows:

- Organics–70 mg/l
- Inorganics–18,400 mg/l
- Radiation Exposure–12,000 rads

Table 5-2. EPA Test Method 9090 Compatibility Studies Comparison

Compatibility Study[a]	Type of Material Tested	General Composition of Leachate	9090[b] Test Concentrations or Radiation Exposure that Demonstrated Compatibility in Each Study
Hanford Liquid Effluent Retention Facility (LERF)	60-mil smooth HDPE from four manufacturers	Organics	16.25 mg/L
Hanford W-025 Landfill	60-mil smooth HDPE	Inorganics	204,210 mg/L
		Organic Leachate and Radiation Exposure	50,000 rads
		pH	9.2
Hanford Grout Facility	60-mil smooth HDPE	Inorganics	368,336 mg/L
		Organic Leachate and Radiation Exposure	37,000,000 rads
		pH	>14
Kettleman Hills Landfills	60-mil smooth HDPE	Organics	93,040 mg/L
		Inorganics	250,000 mg/L
		pH	>12

a. Detailed compatibility test information is provided in Evaluation of Liner/Leachate Chemical Compatibility for the Environmental Restoration Disposal Facility report (USACE, 1995).

b. EPA Test Method 9090 "Compatibility Test for Wastes and Membrane Liners" (EPA, 1992c).

A review of the studies presented in Table 5-2 leads to the conclusion that the inorganic concentration developed for the W025 is somewhat conservative as it significantly higher than inorganic concentrations developed for the ICDF facilities. Other than the W-025 landfill, the ICDF is estimated to be most similar to the waste type to be received at the IDF of the studies included in Table 5-2. Nonetheless, the liner/leachate compatibility study for the IDF is based on the W025 synthetic leachate. Further analysis of the applicability of these leachate concentrations is recommended, if the conservative nature of this synthetic leachate requires costly revisions to the lining system to demonstrate compatibility.

5.6.3 Chemical and Radiation Resistance

Leachate will be generated from precipitation events and from water added to the waste for dust control and compaction purposes during operations. In reality, as the landfill nears the end of its operational life, concentrations of contaminants will decrease with time as the leachable waste mass is reduced. During the post-closure period, a robust landfill cover will significantly reduce infiltration, and the corresponding volume of leachate. Soluble contaminants leached from the waste will come in contact with the landfill bottom liner system during the operation period (approximately 10 years for each of the four planned phases) and minimum post closure period (30 years). The geosynthetics and admix lining system components may be in contact with soluble contaminants as long as contaminants are present in the landfill.

The expected chemical make up of the leachate for the IDF landfill was determined based on previously conducted compatibility studies (as discussed above) applicable to the same waste stream (the W025 studies), summarized as follows.

5.6.3.1 Geomembrane

HDPE geomembranes can deteriorate from contact with certain leachates, resulting in a decrease of elongation at failure, an increase in modulus of elasticity, a decrease in the stress at failure, and a loss of ductility.

Studies performed on polymer materials like HDPE show that their properties begin to change after absorbing ionizing radiation between 1,000,000 to 10,000,000 rads (Koerner et al., 1990). The HDPE geomembrane lining the bottom of the landfill will absorb ionizing radiation energy from the leachate generated in the landfill. Energy will be absorbed during the operational life of the landfill, as long as there are liquids with ionizing radionuclides in contact with the geomembranes.

Relevant compatibility studies on HDPE geomembranes have been performed for the W-025 Landfill (Golder, 1991a; TRI, 1995; WHC, 1995). The results of these studies indicate that a HDPE geomembrane will function well as a liner beneath the landfill waste.

EPA Method 9090 tests performed on HDPE geomembrane for the W-025 landfill, using the synthetic leachate solution (assumed representative of IDF leachate concentrations) resulted in no evidence of geomembrane deterioration. A comparison between the anticipated IDF landfill leachate (W-025 Landfill) and that used in compatibility tests for other facilities is summarized in Table 5-2.

Geomembrane samples tested for the W-025 facility did not produce measurable changes in the HDPE liner properties when irradiated for 120 days with a total dose of 50,000 rads. HDPE geomembranes are manufactured with additives, such as carbon black and antioxidants, to improve ductility and durability. The literature also indicates that these additives allow higher doses than standard HDPE material without additives (Kircher and Bowman, 1964). The literature indicates that thin films (i.e., 0.002 inches) of different types of HDPE material alone can become brittle when irradiated at doses between 4,400,000 and 78,000,000 rads. Studies performed using polymer materials, with carbon black and antioxidant additives, show that properties typically begin to change at a total radiation dose of between 1,000,000 and 10,000,000 rads (Koerner et al., 1990).

The manufacturers of the geosynthetic products proposed for the IDF landfill have published maximum allowable concentrations of various chemical compounds that can contact the HDPE geomembrane without adversely affecting its performance. The most recent recommended maximum concentrations of chemicals were obtained from the manufacturers of HDPE geomembrane (meeting the requirements for the IDF technical specifications). A list of the manufacturers' maximum allowable concentrations for specific leachate constituents for HDPE geomembrane and the GCL materials is shown on Table 5-3.

5.6.3.2 Geosynthetic Clay Liner (GCL)

The GCL underlying the geomembrane in the IDF landfill consists of processed sodium bentonite clay, sandwiched between two geotextile fabrics. Sodium bentonite is an ore comprised mainly of the montmorillonite clay mineral with broad, flat, negatively charged platelets that attract water, which hydrates the bentonite. The swelling provides the ability to seal around penetrations, giving the GCL its self-healing properties. A GCL product with Volclay-type sodium bentonite (manufactured by CETCO) is specified for installation at the landfill.

The compatibility of GCL materials is usually demonstrated by permeating the material with leachate and then determining its hydraulic conductivity. Typically, solutions with high concentrations of contaminants or pure products are allowed to permeate a sample under confining pressure and the saturated hydraulic conductivity of the material is determined using ASTM methods such as ASTM D5084. A significant increase in saturated hydraulic conductivity (approximately one order of magnitude) for a sample permeated with leachate, compared with a sample permeated with water, would be an indicator of incompatibility.

Based on review of the published studies (Ruhl and Daniel, 1997; Shackelford, et al., 2000; and EPA, 1995), GCLs perform well unless exposed to high concentrations of divalent cations, very acidic or basic solutions, or solutions with a low dielectric constant (such as gasoline). The leachate expected at the IDF will have a pH of 9.2, which is a mid-range pH. The studies further demonstrate that, when confined under a higher normal load (greater than 2000 psf) or if water is the first wetting liquid (Daniel et al., 1997), GCLs will perform well when exposed to high divalent cation concentrations. The GCL for the IDF lining system is expected to confine under normal loads in excess of 2000 psf as soon as the first lift or waste is placed.

No studies were identified that considered the long-term effects of radiation on the physical properties of GCL materials. Since long-term studies cannot be conducted, conservative radiation limitations have been employed. Low-hydraulic conductivity soils have been used at multiple DOE facilities containing radioactive waste. The only known potential adverse reaction that can occur with a GCL is high heat that could dry out the materials. The amount of radioactivity is expected to be low in the IDF landfill waste and will not generate a significant amount of heat that can desiccate the admix liner. Also, it is assumed that the ILAW packages will be cooled to ambient temperatures prior to placement with the cell.

It should be noted that the operations layer and drain gravel will provide a 3-foot buffer on the side slope and a 4-foot buffer between the liner system and waste for additional thermal protection, if needed.

Sodium bentonite is the primary clay mineral in a GCL that produces the low hydraulic conductivity and high swell potential. Exposure of sodium bentonite to liquids containing concentrated salts (such as brines), or divalent cation concentrations (such as Ca++ and Mg++), reduces the swelling potential and increases its hydraulic conductivity. Concentrated organic solutions (such as hydrocarbons) and strong acids and bases can break down the soil, which also increases hydraulic conductivity. The physical mechanism that causes these changes is a reduction of the thickness, and related absorption capacity, of the diffuse double layer of water molecules surrounding the clay minerals. This results in an effective decrease in the volume of the clay, since the water molecules are not attracted to the clay particles.

The GCL manufacturer allows the use of GCL with few restrictions on maximum chemical concentrations. Leachate concentrations for the IDF landfill (based on synthetic leachate from W025) have relatively high inorganics and dissolved salts. The W025 dissolved salt concentrations are above the manufacturers recommended concentration of 35,000 mg/L (see Table 5-3) (CETCO, 2001). As a point of reference, this concentration of dissolved salts is typical of seawater (USGS, 1989). However, the dissolved salt concentrations in the IDF leachate have been characterized as primarily sodium, and the synthetic leachate was comprised of entirely sodium salts, not the divalent cations such as Ca++ and Mg++, as assumed by the manufacturers. As such, the impact on GCL hydraulic conductivity should be less as compared to divalent cation solutions. Additionally, any effects of leachate degradation on the GCL would be minimized by hydration of the GCLs' sodium bentonite with relatively "fresh" water, allowing the GCL to swell initially and decrease hydraulic conductivity.

The rationale for use of the GCL in the IDF landfill primary liner is to "deflect" leachate from defects or pinholes in the geomembrane over the bottom area and longer-term storage areas (such as the leachate sump trough), where leachate head potential is greatest. The main purpose of the primary GCL is to reduce the actual leakage rate into the LDS in the event of leak in the primary geomembrane (see Section 5.10 and Appendix C.10). The GCL is expected to contact leachate only in the event of a leak in the primary geomembrane. These leachate collection and storage areas are subject to flushing throughout the active life of the landfill due to phased development and fill sequence, resulting in a more dilute leachate in leakage areas prior to attaining maximum leachate concentrations. Based on these considerations, the GCL and landfill liner system approach should perform as intended under the anticipated conditions.

5.6.3.3 Admix Liner

The admix layer consists of onsite silty sand mixed with processed bentonite amendment, similar to that used in the construction of GCLs. The swelling of sodium bentonite provides the ability to seal around soil particles, giving the admix a low hydraulic conductivity and self-healing properties. The compatibility of the admix layer with anticipated irradiation and leachate concentrations were evaluated previously as part of the W025 landfill design (Golder Associates, 1991b). The following summarizes the results of the compatibility testing for the admix layer that are directly applicable to the IDF landfill admix liner, since similar materials will be used in construction. More detailed discussion of the IDF admix liner design is provided in Section 5.4.

In the W025 study, samples of the admix were irradiated, similar to that conducted for the geomembrane layer, as discussed previously. Differences between irradiated and non-irradiated samples were not considered significant based on the results of testing.

The initial W025 admix design contained approximately 8 percent bentonite clay. Testing indicated an acceptable hydraulic conductivity of this admix after hydration in fresh water. However, when hydrated in leachate, some hydraulic conductivity test values were twice the allowable limit and, therefore, this admix formulation was not considered acceptable. This is the same leachate chemistry assumed for the IDF landfill.

It should be noted that there are two factors not considered in the W025 compatibility study (Golder Associates, 1991b) that would mitigate the impact of the synthetic leachate on the 8 percent admix samples, as listed below:

Effective stress for samples–hydraulic conductivity tests were performed with effective stresses of 5-10 psi across sample (equivalent to less than one full lift of ILAW packages). It is well documented that higher effective stresses will lower hydraulic conductivity and mitigate the effects of shrinking/cracking in clay under attack from chemicals. In reality, by the time any leachate contacts the lining system, there will be a substantial stress load on the liner that will mitigate the impacts of chemicals in leachate on the admix liner.

First wetting liquid–W025 tests were performed using both site water and synthetic leachate as the initial wetting fluid. It is well documented that if a clay soil is "attacked" by inorganics prior to saturation, the increase in hydraulic conductivity will be more dramatic than if water is first permeant. This was confirmed by W025 testing–there was an order of magnitude difference between samples with water as first wetting liquid as opposed to leachate. It is reasonable to expect something closer to water than concentrated leachate will be the first wetting liquid for the IDF admix liner.

Due to the results in the W025 testing showing greater than acceptable hydraulic conductivity in the admix when exposed to the W025 synthetic leachate, the bentonite percentage was increased from 8 to 12 percent. An admix containing 12 percent bentonite clay was permeated with synthetic leachate and tested with a resulting hydraulic conductivity that was 3 to 10 times lower than the maximum allowable limit (10-7 cm/sec). This admix formulation was considered acceptable with respect to W025 leachate compatibility and is applicable to the IDF. Thus, the technical specifications (see Section 02666) require a nominal 12 percent (range from 11 to 14 percent is acceptable) bentonite by weight for the admix liner. Consideration should be given to lowering the bentonite percentage upon further characterization of the IDF leachate and applicability of the mitigating factors discussed above.

5.6.3.4 Other Materials

Other materials for which compatibility needs to be addressed are the CDN and geotextiles (cushion, separation, and bonded to geonet of CDN). While these materials do not serve a barrier function, they provide either for removal of leachate or protection of the lining system and must continue to function when exposed to leachate.

During the W025 design, the effect of the synthetic leachate on the geonet core of the CDN and the geotextiles was evaluated (Golder Associates, 1991a). The study concluded that a geonet core comprised of HDPE provided adequate chemical and radiation resistance. For geotextiles, the study concluded that geotextiles made of polyester fabric were susceptible to degradation and recommended that geotextile material be limited to a more chemically resistant material such as polypropylene. The technical specifications for the IDF require that geotextiles be made from polypropylene (see Section 02371); thus, the geotextiles used for the IDF should have adequate chemical and radiation resistance.

Table 5-3. Maximum Allowable Concentrations in Leachate by Chemical Category for Geosynthetic Components

Chemical Category	Compatible Concentration for HDPE	Compatible Concentration for GCL	IDF Concentration Dose or Value
Organics	500,000[a] mg/L	500,000[b] mg/L	N/A
Acids and Bases	750,000[a] mg/L	500,000[b] mg/L	0[d] mg/L
Inorganic	500,000[a] mg/L	500,000[b] mg/L	204,000 mg/L[c]
Dissolved Salts	No Limit	35,000[a] mg/L	204,000 mg/L[c]
Strong Oxidizers	1,000 mg/L	No limit	0 [d] mg/L
Radionuclides	1,000,000[b] rads	No limit	50,000 rads[c]
PH	0.5 - 13.0[a]	0.5 - 13.0	9.2

a. Based on the typical manufacturers' maximum concentration of the list of constituents by the manufacturers.
b. Based on reported literature values.
c. Based on synthetic leachate formula for W-025
d. Strong acids, bases, or oxidizing compounds were not identified in the W-025 compatibility studies.

5.7 Drainage Layer

The drainage layer for the LCRS consists of three components: the separation geotextile, the CDN, and the drainage gravel. Analyses for the drainage layer required evaluation of these components.

5.7.1 Geotextile Analyses (Separation)

Analyses were performed to verify that a separation geotextile between the operations layer and leachate collection drain gravel is required by evaluating natural graded filter criteria for these materials. Results indicated that natural filter criteria could not be achieved, thus a separation geotextile is required between the operations layer and drain gravel. Supporting natural filter calculations are included in Appendix C.6.a.

Analyses were conducted to determine the proper apparent opening size (AOS) and permittivity of the separation geotextile. Required AOS and permittivity were determined based on filter, fines retention, and clogging potential criteria. Results of these analyses were used to develop the technical specifications for the separation geotextile (see Section 02371). Supporting geotextile filter calculations are also included in Appendix C.6.A.

5.7.2 CDN Selection

The CDN selection was based on analysis of two design issues, CDN geotextile puncture resistance and CDN required transmissivity.

5.7.2.1 CDN Geotextile Puncture Resistance

The LCRS CDN layer at the IDF will be overlain by the operations layer on the 3H:1V side slope. The operations layer is allowed to contain a particle size up to 2 inches in dimension. An analysis was performed to determine if the geotextile bonded to geonet (to form the CDN) would be punctured by particles/rocks of this size.

The method developed by Koerner (1998) was used to calculate the puncture resistance. Koerner's method considers the size and shape of the rock, as well as other factors that could decrease the long-term strength of the geotextile. The two loading conditions examined were initial placement of the operations layer and the final depth of waste and closure cover. The geomembrane puncture resistance analysis (see Section 5.5.4) provides the details for the load analysis for these conditions. Detailed calculations for CDN geotextile puncture resistance and corresponding cushion geotextile requirements are included in Appendix C.6.b1.

Results of the analyses indicate that the required puncture resistance is 11.2 lbs. The minimum specified value for Type 1 geotextile (see technical specifications, Section 02371) is 65 lbs. Applying a partial safety factor of 2 gives a minimum resistance of 32.5 lbs. Therefore, the proposed geotextile bonded to the geonet of the CDN will resist puncture with a global safety factor of 2.9; it is adequate for resistance to puncture from the overlying operations layer under the pressure of maximum landfill contents pressure. Koerner (1998) recommends a minimum global safety factor of 2.0.

It should be noted that the results of this analysis are considered conservative because the analytical method assumes only a uniform particle size and does not take the surrounding soil matrix into consideration. This would effectively reduce the particle size by a considerable degree.

5.7.2.2 CDN Required Transmissivity

An additional selection criteria for the CDN is the required transmissivity (or flow rate) under design loading conditions. For the IDF two cases require analysis:

LDS CDN on bottom and side slope–For this case, the critical condition is to ensure that the transmissivity as required by WAC and EPA regulations (3 x 10-5 m2/sec) under the maximum load from the landfill contents can be achieved.

LCRS CDN on side slope only–There are actually two loading conditions for the LCRS CDN on the side slope. One is the open slope condition with operations layer only over the CDN, which is a low normal load (1,000 psf) condition. The second is in the filled condition, which is a high normal load (15,000 psf) condition. Based on the results of leachate production analyses using the Hydrologic Evaluation of Landfill Performance (HELP) model (see Section 5.8), the required transmissivity for the LCRS CDN is 6.5 x 10-5 m2/sec for the open slope condition and 1 x 10-5 m2/sec for the filled condition.

For each case, the approach was to compare the required transmissivity to typical manufacturer's data with test conditions (i.e., normal load and material boundary), similar to the design conditions. The allowable transmissivity (φ) was determined using guidance provided by GRI standard GC-8 (2001), *Determination of the Allowable Flow Rate of a Drainage Geocomposite*. The GRI-GC8 standard uses the following equation:

$\varphi_{allow} = \varphi_{100\,hr\,test}$/Reduction Factors for intrusion, creep, chemical clogging and biological clogging

The FS for design was then determined as follows:

$FS = \varphi_{allow}/\varphi_{required}$

Transmissivity data for the 100-hour test data was obtained from the manufacturer for both 200-mil and 250-mil thickness CDN for normal loads of both 1,000 psf and 15,000 psf. Test data was provided for a number of boundary conditions including flow tests between a geomembrane and a soil, as would be the case for the LCRS or LDS CDN. Test data used as the basis for the analyses are included with the calculations presented in Appendix C.6.b2.

Based on the analyses, a higher flow, thicker (250-mil minimum) CDN is required, due to the reduction of flow under the high normal loads in the final filling configuration. The technical specifications (see Section 02373) provide the required index values for the geonet core of the CDN as well as the CDN itself (with geotextile bonded to both sides of the geonet), based on the results of this analysis. The transmissivity requirements in the technical specifications are index values and not in-service condition values, as determined in this analysis. These index values are representative of testing that manufacturers typically perform in production and are correlated to design conditions using the approach outlined in GRI GC-8.

5.7.3 Drainage Gravel Selection

Section 02315 (Fill and Backfill) in the technical specifications requires that drain gravel meets the requirements of WSDOT 9-03.12(4) for gradation. The technical specifications also require a performance specification for a hydraulic conductivity greater or equal to 10-1 cm/sec.

Hydraulic conductivity of the specified drain gravel was estimated using two different empirical relationships. The most relevant of the two estimates a minimum hydraulic conductivity of 1 cm/sec, based on the specified gradation curve for WSDOT Gravel Backfill for Drains (9-03.12[4]). Supporting calculations are included in Appendix C.6.c.

The minimum estimated hydraulic conductivity for the drain gravel exceeds the required (by WAC and EPA regulations) hydraulic conductivity of 10-2 cm/sec by a factor or 100 to 1,000, and the performance specification hydraulic conductivity of 10-1 cm/sec by a factor of 10 to 100. This exceedance makes an allowance for two items: (1) it allows for the uncertainty in the empirical formulas used to predict hydraulic conductivity, and (2) it also allows for the potential long-term reduction in hydraulic conductivity in the drain gravel as fines from waste filling and the operations layer migrate into the gravel over time.

As part of Construction QA, testing it is recommended that samples of imported drain gravel be tested for conformance with the gradation and hydraulic conductivity requirements in the technical specifications.

5.8 Leachate Production

5.8.1 Leachate Production Analyses

Estimates of the amount of leachate produced during the development and operation of the IDF were needed to design the components of the leachate collection and conveyance system described in Section 5.9, and to provide information necessary when evaluating slope stability of the side slope and bottom liner systems. Leachate is produced when precipitation falls within the lined area and infiltrates vertically through the waste and/or bottom liner system. The amount of infiltration estimated to occur depends on the hydrologic processes and the relative fraction of precipitation that results as leachate and is collected by the leachate collection system.

The water balance components of the hydrologic process were estimated using EPA's *Hydrologic Evaluation of Landfill Performance (HELP) Model* (Schroeder et. al., 1997), a well known standard for water balance modeling. The HELP model has been widely used for evaluating hydrologic conditions and is the standard model used for providing information necessary for the design of landfill systems. Estimates of the water balance components of the hydrologic cycle provided by HELP include precipitation, evapotranspiration, surface water runoff, vertical percolation, soil moisture storage, and lateral drainage in soil layers.

The HELP model requires input of weather data, representing the conditions at the landfill location, soils data representing the various layers of cover soils, waste materials, and soils underlying the waste layers, and other design data used by the model for water balance calculations. A detailed description of the model and modeling inputs are included in Appendix C.7.

The development of the IDF from Phase I through Phase IV was considered to determine the maximum flow condition expected during development and operation of the landfill. That is, various combinations of open and interim closed phases were considered and the combination calculated to produce the maximum amount of leachate was chosen for analysis. The chosen combination was Phase I through III under interim closure condition and Phase IV in the open condition with little or no waste present. The flows from this condition were used to size the LCRS collection piping and pump systems.

Water balance components were taken directly from model output and a spreadsheet was used to calculate the volumes of leachate by multiplying the HELP output parameter by the area of the type of system modeled. For example, the lateral drainage estimated by the HELP model for the uncovered side slope condition in Phase IV development was multiplied by the total side slope area to determine the total volume of leachate from that area. A spreadsheet summarizing the estimated leachate flows is included in Appendix C.7.

The following modeling results were used for various aspects of design of the IDF systems:

LCRS collection system–Modeling results for the peak day event were used to size the leachate collection system piping that conveys flow to the LCRS systems. The peak day event, as predicted by HELP and referenced herein, was a 1.6-inch precipitation event. This event is approximately 25 percent higher than the 25 year, 24 hour peak day storm event of 1.28 inches (Appendix C.9), required by regulations to be used when complying with the maximum 12 inches of head over the liner (WAC 173-303-665, see Section 2). The spacing of the LCRS perforated collection piping and the properties of the drain gravel material that convey lateral drainage flows above the bottom liner geomembrane to the collection piping and LCRS sump area were checked to insure the maximum head buildup above the sump area of the liner system did not exceed the maximum allowed according to regulatory requirements, as outlined in Section 2.

LCRS pump and forcemain systems–Modeling results for the peak day event were used to size the LCRS high flow pump system that conveys flow to the leachate storage tanks and truck loadout facilities.

Average monthly flow rates plus one standard deviation (resulting in a conservatively-high expected flow rate) was used to design the LCRS low flow pump system for pumping from the IDF during average monthly conditions.

Leachate Collection Storage–Volumes for the peak day event and assumptions for the operational rate of removal of leachate from the tanks were used to size the storage tanks. Storage tank sizing is described in Section 5.9.2.2.

Liner system material properties and stability analyses–The lateral drainage layers of the side slope and bottom liner systems were checked to insure the transmissivity of the layers was sufficient to convey lateral flows and maintain less than the maximum head buildup over the liner system. The seepage height above the liner was used when checking the liner system for veneer stability.

5.9 Leachate Collection System

5.9.1 Earth Loading Analyses

5.9.1.1 Leachate System Loading Analyses for Piping within Phase I Liner Limits

Loading over the leachate system piping include all layers of soil materials, wastes, and anticipated traffic loading. The maximum loading occurs over the piping in the LCRS and LDS sump area, because of its low elevation and the height of material–both waste and soil layers–overlying the sumps. Loading calculations from the geosynthetic liner puncture resistance calculations described in Section 5.5.4 were modified to represent the maximum loading in the LCRS/LDS sump area. Other pipes in the Phase I area, including piping outside the sump and the side slope riser piping, will be subjected to less than the maximum loading. The maximum loading is listed in Appendix C.8.a, along with the calculations for pipe sizing required to withstand this anticipated pipe loading.

Pipe wall thickness was selected based on the maximum loading anticipated in the sump area such that the pipe will not fail due to excessive deflection, wall buckling, or wall crushing. All other piping in Phase I outside of the sump area was chosen with the same standard dimension ratio (SDR) to withstand the maximum load. Standard analysis methods, as recommended by the manufacturer of HDPE pipe made from PE3408 type resin, were used to evaluate pipe strength under loading. These standard methods are based on flexible pipe design practice as applied to HDPE piping. The manufacturer's recommended design analysis techniques are based on standard analysis techniques, including the Iowa formula (*Waste Containment Systems, Waste Stabilization, and Landfills Design and Evaluation*, Sharma and Lewis, 1994), with conservative factors of safety. The potential loss of strength due to the perforations in the perforated collection piping was assumed non-significant, based on actual test results of perforated pipe under similar load rates. The pipe material assumed is High Density Polyethylene

PE3408 pipe with a cell classification of 345434C or better. The flexural modulus and material strength of the pipe was per manufacturer's published literature, based on this classification of pipe.

5.9.1.2 Leachate System Loading Analyses for Piping Outside of Phase I Liner Limits

Piping outside the Phase I liner area includes all underground piping between the crest pad building, combined sump, leachate transfer building, storage tank, and tanker truck load out facility (see Drawing H-2-830846). The civil road layout in these areas is generally configured to allow medium to light duty trucks, such as would be used for operations and maintenance activities. The leachate tanker truck accesses the concrete truck load pad only, and would not normally pass over any piping. However, the piping outside the Phase I Liner area was designed for H-20 semi-trailer type loading to be conservative. The same SDR pipe that used for the high loading within the Phase I liner limits as described in Section 5.9.1.1 was assumed for all piping exposed to earth and traffic loading outside of the Phase I liner limits. The expected pipe loading for H-20 loading plus earth load was compared to the loading used for designing the piping inside the Phase I liner limits and was found to be much lower. Since the pipe SDR is sufficiently strong for the maximum loading inside the Phase I limits, it will have more than sufficient strength for loading expected outside the Phase I limits. Calculations are included in Appendix C.8.a.

5.9.2 Leachate System Hydraulics Analyses

5.9.2.1 Leachate System Hydraulics Analyses

The leachate collection and conveyance system collects leachate that accumulates as a result of precipitation landing within the footprint of the cells, and it conveys the collected leachate from the cells to a storage tank or tanker truck. Perforated collection piping in the LCRS collects and conveys leachate from the bottom liner system and conveys it to a LCRS sump area in both cells. Lateral flow of leachate from the side slope and bottom liner areas also is conveyed directly to the sump area through a high permeability gravel layer and/or geosynthetic drainage net material. Submersible pumps in the LCRS sump and contained within perforated riser pipes convey leachate to the crest pad building and directly to the leachate storage tank or the tanker truck load facility. Hydraulics analysis was conducted to size the gravity flow piping of the LCRS collection piping and the pump and force main system from the sump area to the storage tank and tanker truck load facility. Sizing and design of leachate collection and conveyance systems were based on ultimate build out of the IDF through Phase IV. That is, the components installed as part of the Phase I design are sized for the ultimate configuration and flows estimated through Phase IV.

5.9.2.2 LCRS Gravity Flow Analyses

The LCRS perforated collection piping was sized using standard gravity flow analysis techniques. The pipe size (nominal 12-inch diameter) was chosen as double the minimum size required for cleanout of the pipe to insure any accumulation of fines would not significantly restrict the flow in the pipe, even though the drain gravel surrounding the pipe will have minimal fines present and geotextiles are present in the lining system to further restrict the migration of any fines. The maximum flow used for sizing was the maximum from the HELP predicted maximum day flow rate or the pump flow rate, based on the pump chosen to convey flow out of the cell.

Perforations in the pipe were sized to allow flow rates much higher than the required maximum flow rate out of the cell, with minimal head loss. This assumption was more conservative by virtue of the fact that the main LCRS collection pipe will only collect and convey a portion of the lateral drainage flow from the cell; the drain gravel and CDN will also convey a portion of the flow. Calculations are included in Appendix C.8.b.

5.9.2.3 Leachate System Pumps and Force Mains Analyses

The pump and forcemain systems for conveying leachate out of the cells and into the leachate storage tanks and to the tanker truck load out facility, and the design considerations for each are described below. Calculations are included in Appendix C.8.b.

LCRS pumps and forcemains–The LCRS pumps and forcemains convey leachate out of the cells to storage tanks or the tanker truck load areas. The criteria for pumping capacity is that the maximum head over the sump area of the cell will not be allowed to exceed 12 inches during the peak day event and during normal operations. To meet the requirement for not exceeding the 12-inch criteria for the peak day event, a LCRS high flow pump was sized to handle the expected peak day flow rate, as estimated and described in Section 5.8, Leachate Production. Hydraulic analyses were conducted to size the pump and forcemain piping according to standard practice to convey the maximum flow rate.

A LCRS low flow pump was sized to convey flow out of the cells under normal, monthly operations. The criteria established for the low flow pump was to convey the average monthly flow plus one standard deviation from the cells, assuming the pump could remove that amount of flow with less than continuous operation. The highest value of the average month plus one standard deviation was used for the maximum flow required of the pump. Under lower flow required conditions, the pump would operate near this rate, depending on the system curve head loss characteristics, but would run for a shorter length of time to remove the volume of leachate from the cell.

LDS pump and forcemain–The LDS pump and forcemain conveys flows from leakage through the LCRS sump area, if in the unlikely event any leakage occurs, to the storage tank or tanker truck load out facility. The LDS system is sized to convey the flow equal to the ALR (described in Section 5.11); however, this rate is so small that the pump capacity is much higher than necessary.

Leachate transfer pump to truckload and forcemain–Under normal operations, leachate conveyed out of the IDF will be routed to the leachate storage tank. Periodically the leachate will need to be conveyed to tanker trucks for transport to an offsite water treatment facility. A transfer pump is required to move water from the storage tank to the tanker truck loadout facility. The pump and forcemain were sized to convey approximately 250 gallons per minute (gpm), a rate commensurate with timely loading of the tanker trucks that have capacities equal to approximately 7,000 gallons. At 250 gpm, the tankers can be loaded quickly, depending on the operational requirements for moving leachate and making storage tank capacity available under high precipitation conditions and/or the condition when the storage tanks are at or near capacity. Storage and operations considerations are described in Section 5.9.2.4.

Combined sump pump and forcemain–The combined sump pump and forcemain must convey flow from the sump to the leachate storage tank. The flow criteria for this pump was set at approximately the same flow as the leachate transfer pump. This is based on the worst case scenario of the leachate transfer pump accidentally being left on when the tanker truck is filled, causing the full 250 gpm flow to overflow the truck, collect on the pad, and drain into the combined sump. Under less than maximum flow conditions, the pump would cycle when any leakage from other systems connected to the sump pump reached the level on control setting for the pump. In this case, the pump would cycle quickly to pump the small volume of the inner sump into the storage tank.

Crest pad building sump pump–A small sump pump is provided in the crest pad building to remove minor amounts of water in the sump from sampling activities or piping leaks. The nominal flow rate was chosen as a minimum of four gpm. The pump discharges into the main forcemain line to the storage tank or tanker truck load out facility.

The pump and forcemain piping systems were modeled using standard hydraulic analysis techniques. Actual pump curves for preliminary pump selections were input and the analyses conducted to determine the estimated run condition for the various operational conditions. For example, a pump was chosen for the LCRS high flow pump and forcemain system, and the analysis was run for the conditions of the pump conveying flow to the leachate storage tank and directly to the tanker truck load out facility. Different flow rates and system pressures resulted, based on the differences in the system curve for each flow path versus the pump curve characteristics. Pump cycle times were considered for the flow requirements and total removed volume. The manufacturer's recommendations for cycle times and other operating requirements, where applicable, were checked.

5.9.2.4 Leachate Collection Storage Analyses

The results of the leachate production analysis indicate a total of approximately 269,000 gallons of leachate must be removed from the IDF landfill within 24 hours after a peak storm event. A temporary storage tank for each cell was sized to store leachate generated by the associated cell. The leachate storage tank capacity is dependent on the flow rate of leachate into and out of the tank as well as a factor of safety.

The leachate production analysis indicates the worst case flow rate out of each cell into the associated tank would be 157 gpm (sum of the required flow rates of the high and low flow leachate pumps). The leachate transfer pump for each cell can fill a tanker truck at a maximum of 250 gpm; however, the limiting factor is how often a truck can be filled.

The calculation in Appendix C.8.c presents the method of determining the appropriate storage capacity of each leachate storage tank. The following leachate tanker truck loading activities were assumed:

- Tanker Capacity — 7,000 gallons
- Number of tankers per cycle — 1
- Hours per cycle (roundtrip) — 2.4
- Hours per shift — 8
- Shifts per day — 1
- Leachate tank level prior to event — 2 feet

The calculation indicates that each tank requires a maximum operational capacity of 375,000 gallons to maintain a safety factor of 1.5. The assumptions made in the calculation must be adhered to during operational activities to maintain the calculated safety factor.

5.10 Surface Stormwater

The surface stormwater analysis was done to determine the sizes of the surface stormwater facilities necessary for the IDF Phase I Critical Systems Design. The surface stormwater analysis is documented in detail in Appendix C.9.

The governing regulation is WAC 173-303-665(2) (c) and (d). This requires that the stormwater system be designed to prevent flow onto the active portion of the landfill during peak discharge from at least a 25-year storm. It also requires that the runoff management system be designed to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

The primary purpose of the proposed stormwater facilities is to prevent stormwater runoff from areas adjacent to the two Phase I cells from entering the cells during Phase I operation. This will be done by collecting, conveying, and safely discharging stormwater from areas outside of the two Phase I cells that would otherwise run into these cells.

The Department of Ecology has issued State Waste Discharge Permit Number ST 4510 for industrial stormwater discharges to the ground through engineered land disposal structures on the Hanford site (ST 4510, Ecology, 1999; DOE/RL97-67 Revision 3, January 2000). Since the design for this project does include facilities for collecting stormwater runoff and discharging it to the ground, the permit was reviewed to determine whether it applied to these stormwater discharges. To be covered by this permit, the stormwater must be considered an industrial discharge that is collected in an engineered structure and is then discharged to the ground through an engineered structure. A stormwater discharge is an industrial discharge if the stormwater has the potential to come into contact with an industrial activity or is collected within an area of industrial activity. The purpose of the stormwater facilities that have been designed for this project is to prevent the stormwater from areas outside of the Phase I landfill from entering the landfill area. Therefore, the stormwater collected by these facilities would probably not be considered industrial stormwater. To be an engineered structure for the collection of stormwater, the structure has to be an impervious surface that is directly associated with industrial activities. The stormwater collection facilities designed for this project do not have impervious surfaces. Therefore, permit ST 4510 does not apply to the stormwater system designed for this project.

Stormwater facilities were designed only for the operation stage of Phase I and not for interim or final closure conditions. Therefore, no stormwater facilities have been designed for stormwater runoff from the Phase I cells after construction of their interim closure or final closure. Stormwater needs for the construction, operation, and closure of future phases were not considered.

No stormwater collection and conveyance facilities were analyzed and/or designed for any of the roads and support facilities that will be constructed as part of this project. The roads will be gravel surfaced, and stormwater that does run off the roads into adjacent areas will infiltrate. The stormwater from the roofs of the buildings will be caught in gutters and discharged to the ground surface via down spouts. The stormwater that falls on the leachate tanks will evaporate off the floating covers.

5.10.1 Existing Conditions

Under existing conditions, the area around the Phase I site slopes down gently from south to north at an average grade of approximately 0.5 percent.

The only area that may generate stormwater that can run into the Phase I excavation is the area that extends south from the excavation area to the crest of the sand dunes, located north of 1st Street (see drainage areas figure in Appendix C.9). This drainage area is moderately vegetated, primarily with large sage brush and grasses. The soils are generally sandy, with relatively high rates of infiltration. This area typically receives little precipitation. There is little to no runoff, and stormwater normally either infiltrates or is used by the vegetation. No existing drainage channels are apparent. The groundwater table is approximately 300 feet below the ground surface.

5.10.2 Proposed Stormwater Facilities

To prevent stormwater from the area south of the Phase I excavation from running overland into the excavation, a combination stormwater berm/ditch will be constructed south of the top of the south slope of the excavation. The south end of the excavation will be approximately 1,400 feet long, and the ground will be essentially flat. The berm/ditch will have a center high point and then slope down to the east and to the west (two discharge points). A berm will be constructed immediately south of the ditch. At the centerline of the excavation, the invert of the ditch will be at the existing ground surface, and the berm will form the south slope of the ditch. The ditch will be excavated, with a longitudinal slope of 0.5 percent to both the east and the west. This will be done in order to minimize the depth of the ditch at its east and west ends. Culverts will be installed at the east and west ditch ends to convey the flow under the access roads. The culverts will discharge into the east and west infiltration areas.

The base map does not show any areas where stormwater runoff from offsite areas may flow into the east or west boundaries of the Phase I excavation. However, if any offsite stormwater should flow toward these boundaries, the fill for the berm access road and the shine berm will prevent the stormwater from flowing into the excavation (see drainage areas figure in Appendix C.9). The intercepted stormwater will flow south along the toe of the fill and either infiltrate or flow overland to the north, away from the site at the north end of the berm access road.

The ground slopes away from the north end of the Phase I site, so there will be no offsite stormwater running toward the north Phase I boundary.

The Phase I liner will end north of the toe of the south slope of the Phase I excavation. In order to reduce potential leachate flows, a stormwater berm/ditch will be constructed just south of the south end of the liner. This berm/ditch will intercept and convey stormwater runoff from the unlined south slope and the unlined southern ends of the east and west slopes. The berm/ditch will be sloped to drain to the east. A stormwater pipe will convey the stormwater under the landing for the access ramp and will discharge to the excavation infiltration area. If this pipe ran straight from the ditch to the infiltration area, it would not have adequate cover. Therefore, a catch basin with a solid cover will be installed near the west end of the stormwater pipe. The invert of the pipe out of the catch basin will be lower than that of the pipe running into this catch basin. The stormwater pipe that will run from the catch basin to the excavation infiltration area will then have adequate cover. The excavation infiltration area will be excavated in the southeast corner of the excavation.

The south edge of the access ramp into the Phase I excavation and the south edge of the "flat" area at the bottom of the access ramp will serve as ditches. The access ramp will have a cross-slope of 2 percent down to the south. The "flat" area at the bottom of the access ramp will have a slope down to the south that varies between 1 and 3 percent. Adjacent to each of these will be the south slope of the excavation. Construction of a full V-shaped ditch along the south side of the access ramp and the "flat" area was considered. This idea was rejected because it would result in a larger excavation with the top of the Phase I south slope moved further south.

The stormwater facilities are shown on the Phase I Grading and Drainage Plan drawing (Drawing H-2-830830).

Stormwater runoff from the north, east, and west lined slopes of Phase I will run into the bottom lined area and will become leachate.

There are no provisions in the design of the Phase I critical systems to divert clean runoff from these side slopes and discharge it to the surface water system instead of the leachate system at this time. However, a rain curtain or other approach to reduce the amount of clean runoff from the lined area that enters the leachate system may be considered in the future.

5.10.3 Analysis

The surface stormwater analysis is documented in Appendix C.9 and is summarized below. Stormwater runoff flows were estimated for a 24-hour, 25-year design event, using the Soil Conservation Service curve number methodology as documented in *Urban Hydrology for Small Watersheds* (U.S. Department of Agriculture, June 1986) and the Hydraulic Engineering Cirular-1 (HEC-1) computer program (*Flood Hydrograph Package (HEC-1)*, U.S. Army Corps of Engineers, Hydrologic Engineering Center, revised June 1988). The precipitation data used was based on information from the *Hanford Site Climatological Data Summary 2001* (Pacific Northwest National Laboratory, May 2002). The ground at the project site is periodically frozen during the winter months, when the most precipitation falls. Therefore, it was assumed that the ground was frozen for the runoff flow calculations.

The peak flows (calculated using the HEC-1 model) were checked for reasonableness. The tabular and graphical methods in TR 55 were used to estimate peak 25-year flows for each of the drainage areas modeled in HEC-1. The results confirmed the reasonableness of the peak flows calculated by HEC-1.

The berm/ditches were designed to convey the peak 25-year flow with a minimum freeboard of one foot.

The infiltration areas were sized based on containing and infiltrating the runoff from the 24-hour, 25-year design event, without causing the water surface to extend above the upstream end of the culvert or stormwater pipe that will discharge to the infiltration area. No specific infiltration data have been collected at the IDF project site. However, infiltration rates have been determined for use at the Waste Treatment Plant (*Geotechnical Report Supplement No. 1*, Shannon and Wilson, April 2001). These infiltration rates were used in sizing each of the infiltration areas.

The culverts and stormwater pipes were designed to convey the peak 25-year flow with a maximum headwater to a diameter ratio of 1.25. Both inlet and outlet flow conditions were analyzed. The starting water surface for the outlet flow condition calculations were the maximum water surface elevation estimated for the associated infiltration area for the 24-hour, 25-year design event.

5.11 Action Leakage Rate (ALR)

5.11.1 LDS ALR

The ALR is defined in WAC 173-303-665(8) and the Final Rule (EPA 1992a, 40 CFR Part 264.222) as the "maximum design flow rate that the leak detection system…can remove without the fluid head on the bottom liner exceeding 1 foot". This calculation was performed to determine the ALR for the IDF lining system. The IDF consists of two cells, each with an area of approximately 8.5 acres.

In addition to determining the ALR, an estimate of actual leakage rate through the proposed primary bottom lining system is provided as a comparison to the calculated ALR. HELP modeling for the side slope indicates negligible head build-up on the side slopes (see Section 5.8), thus an estimation of the actual leakage rate was determined for the bottom primary lining system only.

EPA provides a formula (based on Darcy's Law for calculating this flow capacity), assuming that it originates from a single hole in the primary liner (EPA, 1992b). Calculations presented in Appendix C.10 provide details of the method of analysis and input data. The ALR calculations are dependent on the transmissivity value for the CDN. A value of 3 x 10-5 m2/sec was used in the ALR analysis (equivalent to the value required by WAC and EPA regulations for the LDS, Section 5.7.2). Calculations in Appendix C.6.b2 provide justification for the transmissivity used in the ALR analyses.

The results of the analyses indicate the ALR for each IDF cell is 206 gallons per acre per day (gpad) or approximately 1,800 gallons per day per cell. This ALR includes a factor of safety of 2 in accordance with EPA guidelines (EPA, 1992b).

It is also much lower than the capacity of the pump that removes liquid from the LDS. The estimated actual leakage rate for the composite primary lining system is 0.06 gpad (small defect) to 0.08 gpad (larger defect) for a composite liner with good intimate contact, and 0.3 gpad (small) to 0.4 gpad (large) for poor contact. Detailed calculations for both rates are presented in Appendix C.10.

The proposed primary composite lining system has a much lower estimated leakage rate than the ALR. This demonstrates the benefit of the GCL that is included in the primary bottom lining system, to provide a composite lining system and minimize actual leakage rate through the bottom primary lining system.

5.12 Building Systems Analyses

5.12.1 Geotechnical Design Parameters

The key geotechnical parameters and analyses for structural design of the supporting facilities for the Hanford IDF included the following:

- Bearing Capacity
- Settlement
- Modulus of Subgrade Reaction
- Earth Pressures
- UBC Seismic Soil Parameters

The methodologies, input data, and results for each of these categories of analysis are presented in detail in Appendix C.11.A.

5.12.2 Structural

5.12.2.1 Crest Pad Building Foundation Analysis, Pipe Bracing and Winch

The crest pad building foundation was analyzed as a concrete slab on an elastic foundation. The foundation was modeled with springs to model the vertical sub-grade reaction. The value of the vertical sub-grade reaction was provided by the geotechnical engineer. The applied loads and load combinations were input into Visual Analysis (version 4.0), a finite element program. The finite element analyses results include elastic settlement, moments, and shears values of the concrete slab. The results were then used to design slab depth and reinforcing.

Load reactions from the pre-engineered metal building were estimated using hand calculations and applied onto the concrete slab at the corners of the slab. It is a reasonable assumption that the frame loads from the pre-engineered metal building will only occur at the corner of the building, since the size of the building will not require any intermediate framing.

Loads and load combinations were used as required by TFC-ENG-STD-06, REV A. Performance category, PC-1 was used as specified and applied as applicable for both wind, seismic, and load combinations requirements.

In summary, the analyses results showed that an 8-inch thick slab sufficed with #5 reinforcing at 12-inch centers. The analyses results also showed that a 1 foot-10 inch edge thickening around the perimeter of the building would be sufficient. More detailed accounting of the analyses is presented in Appendix C.11.b1.

The pipe bracing and support for the small diameter PVC (polyvinyl chloride) piping included both gravity as well as lateral load resistance, due to a seismic event. The governing piping support is assumed a 6-foot-tall cantilever support, with the piping load and 50 pounds of lateral load applied to the top of the support. The 50 pound lateral load was used in lieu of the calculated seismic load because the calculated seismic load was only 19 pounds. Using a 50 pound lateral load gives the pipe support system greater rigidity. Detailed calculations of the pipe supports are included in Appendix C.11.b2.

The winch support was analyzed as a vertical cantilever that supports the winch and resists a total lateral load of 400 pounds.

A 400 pound lateral load was used since the entire gravity load of the pump and the hoses adds up to this weight. Therefore, using 400 pounds in the horizontal direction is conservative. Detailed calculations of the winch support are given in Appendix C.11.b3.

5.12.2.2 Leachate Transfer Building Foundation Analysis

As the leachate transfer building foundation is considered as a slab–on-grade, only hand calculations were performed. Foundation soil reactions were considered to be distributed linearly, then soil pressure distributions were applied to the concrete to calculated the moment and shear values for design of the concrete slab and reinforcing steel.

Load reactions from the pre-engineered metal building were estimated using hand calculations and applied onto the concrete slab along the perimeter of the slab.

Loads and load combinations were used as required by TFC-ENG-STD-06, REV A. Performance category, PC-1 was used as specified and applied as applicable for both wind, seismic, and load combinations requirements.

In summary, the analyses results showed that the 2-foot-6 inch-thick slab with #6 bars at 12-inch centers will suffice and appears to be overdesigned. The 2-foot-6-inch thickness is not based on concrete strength requirements but more for frost depth cover, simplifying the ground forming, and reinforcing bending requirements. Detailed calculations of the analyses are presented in Appendix C.11.c.

5.12.2.3 Leachate Tank Foundation Analysis

The leachate tank foundation is considered to be a concrete ringwall, per AWWA D103-97. The tank gravity loads, including both water load and tank dead loads, were considered in the design of the ringwall.

AWWA D103-97, Factory-Coated Bolted Steel Tanks for Water Storage is not listed in the TFC-ENG-STD-06, REV A. AWWA D100-96, Welded Steel Tanks for Water Storage, is listed; however, this standard does not apply, since the tank will be a bolted steel tank. Therefore, the tank will be designed per AWWA D103-97, Factory-Coated Bolted Steel Tanks for Water Storage.

The analysis of the concrete ringwall and reinforcing is based on the hoop tension on the ringwall from the surcharge of the liquid weight on the soil within the ringwall. In summary, a 4-foot-6-inch-deep by 1-foot-6-inch width ringwall with #7 at 12-inch-longitudinal reinforcing on each face of the ringwall will suffice. Detailed calculations of the analyses are presented in Appendix C.11.d.

5.12.2.4 Truck Loading Station Foundation Analysis and Leachate Loading

The Truck Loading Station foundation was analyzed as a concrete slab on an elastic foundation. The foundation was modeled with springs to model the vertical subgrade reaction. The value of the vertical subgrade reaction was provided by the geotechnical engineer. The applied loads and load combinations were input into Visual Analysis (version 4.0), a finite element program. The finite element analyses results include elastic settlement, moments, and shears values of the concrete slab. The results were then used to design slab depth and reinforcing.

Loads and load combinations were used as required by TFC-ENG-STD-06, REV A. As required, AASHTO HB-16 loading was used with an HS 20-44 load wheel pattern. For maximum axle load, 40,000 pounds was used instead of 32,000 pounds as required per HS 20-44. An impact factor was also applied as required by AASHTO HB-16.

The wheel pattern loading was arranged in three positions on the slab to yield the maximum moments and shears. Supporting calculations and further discussions are presented in Appendix C.11.e1.

The leachate loading support was analyzed as a post with a horizontal boom attached near the top of the post. The design load included the dead weight of the post, boom, and piping full of water. Wind loads were analyzed per ASCE 7-98.

In addition, the lateral load was compared with a 300-pound point load hanging vertically at the end of the boom. The lateral wind load governed for overall overturning at the base of the post; however, the 300-pound point load governed for the boom attachment to the post.

In summary, a 10-inch by 10-inch tube for the post, with a 6-inch by 6-inch tube as the horizontal boom welded to the post will suffice. The geotechnical engineer has verified that a 5-foot-6-inch-deep and 3-foot-diameter concrete encasement around the post will be sufficient for strength and stability. Supporting calculations and further discussions are presented Appendix C.11.e2.

5.12.3 Mechanical/Heating, ventilating, and air conditioning (HVAC)

5.12.3.1 Crest Pad and Leachate Transfer Building

Heating, ventilating, and air conditioning (HVAC) capacities were calculated for the crest pad and leachate transfer buildings. The temperature within the buildings must be controlled within a range to prevent freezing fluids in piping or overheating electronic devices. The HVAC components for the buildings were selected based on the criteria and calculations provided in Appendix C.11.f and C.11.g.

5.12.4 Electrical/I&C

This section introduces and summarizes the results of detailed electrical engineering calculations included in Appendix C.11.h.

- IDF leachate collection and handling crest pad facilities (two each)
- IDF leachate storage tank and leachate transfer facilities (two each)
- IDF truck loading facilities (two each)

5.12.4.1 Building Power Supply

Open Items

The Phase I Critical Systems 80% IDF design documents do not identify the following open items:

- Exact location of primary 13.8 kV, 3-phase tie-in
- Exact value of available primary short circuit current at primary tie-in location
- Exact length of primary extension
- Exact location, size, and impedance of utility step-down 13.8 kV – 480/277V three, phase, 4-wire pad mounted transformer(s)

These items are scheduled to be addressed during the next IDF Phase I Non-Critical design.

Assumptions

The following assumptions were made in order to complete the 80% engineering analysis.

- Assume electrical service gear inside each Cell 1 and Cell 2 crest pad building to be powered by separate pad mounted utility transformers.
- Assume pad mounted utility transformers to be rated 75 kVA and installed within 100 feet of respective Cell 1 and Cell 2 crest pad buildings.
- Assume each pad mounted utility transformer to be radial fed from a common 13.8 kV primary feeder.
- Assume each Cell 1 and Cell 2 leachate transfer building to be powered from electrical service gear, located inside respective crest pad buildings.
- Assume available short circuit at primary side of pad mounted utility transformer(s) to be 100 MVA with an (X/R) ratio equal to 8.
- Assume impedance of 75 kVA pad mounted utility transformer to be 3.2%Z, 2.42%IR, and 2.10%IX.
- Assume power factor and efficiency for all pump motors to be 85 percent and 82 percent, respectively.
- Assume 25 foot candles of lighting levels to be required for interior of each building.
- Assumptions will be reviewed and addressed during the next IDF Phase I Non-Critical design.

Method of Analysis

- Branch circuit, feeder and service calculations in accordance with NEC Code (2002).
- Short circuit analysis (per unit) in accordance with IEEE-Red Book, Standard 141 (1993).
- Grounding electrode analysis in accordance with IEEE-Green Book, Standard 142 (1991).
- Computer analysis by SKM PTW 32 (Power Tools for Windows, 2003).
- Building interior lighting zonal cavity method in accordance with Integrated Engineering Software, Inc. (IES) *Lighting Handbook* (2000).

Analysis Performed Includes

- Calculate and size service, feeder, and branch circuits, based upon demand and design loads.
- Calculate and size equipment, equipment bus amperage, protective devices, and motor overloads, based upon demand and design loads.
- Calculate and size power feeders and branch circuit wiring, based upon demand and design loads.
- Calculate short circuit ratings for equipment.
- Calculate feeder and branch circuit voltage drop, and power factor.
- Calculate building lighting system requirements.

Voltage Drop

Load flow steady state voltage drop calculations for all feeders were based upon an equipment 85 percent power factor. Wire size were calculated and selected so that circuits do not exceed total voltage drop from the source bus to the point of utilization, including feeders and branch circuits:

Service and sub feeders	2 percent	Heat trace from panels	1 percent
Lighting from panels	1 percent	Receptacles from panels	1 percent
Motors from motor control center (MCC)	1 percent	Instrumentation from panels	1 percent

Feeder and Equipment Sizing

Service, feeder, branch circuit conductor ampacity, and protection devices ratings are based upon applicable sections of the NEC (2002) including:

- Lighting Loads per Article 220: Lighting
- Receptacle Loads per Article 220.13: Non-dwelling Units
- Continuous Loads per Article 230: Service
- Motor Loads per Article 220:14 and 430: Motors
- Air Condition Load per Article 440.6: Refrigerant Motor Compressor
- Heat Loads per Article 200.15: Fixed Electric Space Heating
- Non-Coincident Loads per Article 220.21: Non-coincidental Loads
- Heat Trace per Article 427: Fixed Electric Heating Equipment for Pipelines and Vessels

Load Factors

The following table summarizes load factors applied for various equipment in accordance with appropriate sections of the NEC (2002), while determining demand and design load analysis:

Table 5-4. Building Power Supply Load Factors

Item	Panel and Service Load Analysis	Comment
Heater Loads*	100 percent full load amperage (FLA)	Branch circuit sized to 125 percent of FLA
Motor Loads	Sum of motor load (FLA) + 25 percent of largest motor (FLA)	Branch circuit sized to 125 percent of FLA
Receptacles	180 VA /outlet	Non-Continuous Load
Lighting	2 watts/sq.-ft or total connected (FLA), whichever is larger	Continuous Load
Cooling Loads*	100 percent FLA	Branch circuit sized to 125 percent of FLA
Demand Factors	**Demand Factor Percent**	
First 10 kVA	Non-Dwelling Receptacles	100 percent
Remainder over 10kVA	Non-Dwelling Receptacles	50 percent
Non-continuous Load		100 percent
Continuous Loads		125 percent
*Note: The largest of the non-coincidental heat and cooling loads are used for service sizing.		

Table 5-5. Input Data Typical for Cell 1 and Cell 2

Description	Ratings	Comments
Pump 219(Y)-LH-P-202	1/2 HP @ 480V, 3-phase	Coincidental load
Pump 219(Y)-LH-P-203	7.5 HP @ 480V, 3-phase	Coincidental load
Pump 219(Y)-LH-P-204	1/2 HP @ 480V, 3-phase	Coincidental load
Pump 219(Y)-LH-P-205	1/3 HP @ 480V, 3-phase	Coincidental load
Pump 219(Y)-LH-P-207	3 HP @ 480V, 3-phase	Coincidental load
Pump 219(Y)1-LH-P-302	3 HP @ 480V, 3-phase	Coincidental load
Heater 219(Y)-LH-UH-001	3.3 kW @ 480V, 3-phase	Non-coincidental and continuous load*
Heater 219(Y)1-LH-UH-002	3.3 kW @ 480V, 3-phase	Non-coincidental and continuous load*
Air Condition 219(Y)-LH-AC-001	2.04 kVA @ 208V, 1-phase	Non-coincidental load
Air Condition 219(Y)1-LH-AC-002	.96 kVA @ 208V, 1-phase	Non-coincidental load
Control Panel 219(Y)-LH-CP-001	1.5 kVA @ 120V, L-N	Continuous load
Bldg. 219(Y) Lighting	71 kVA @ 120V, L-N	Continuous load
Bldg. 219(Y)1 Lighting	29 kVA @ 120V, L-N	Continuous load
Heat Trace 219(Y)201-LH-HT-001	77 kW @ 120V, L-N	Continuous load
Heat Trace 219(Y)201-LH-HT-002	77 kW @ 120V, L-N	Continuous load
Heat Trace 219(Y)1-LH-HT-003	77 kW @ 120V, L-N	Continuous load
Bldg. 219(Y) Receptacles	720 kVA @ 120V, L-N	180VA/ outlet
Bldg. 219(Y)1 Receptacles	360 kVA @ 120V, L-N	180VA/ outlet

Note: (Y) = A,E
Cell 1 (A), Cell 2 (E)
Heater Load is greater than AC load.

1 **Table 5-6. Building Power Supply Results/Conclusions**

Description	Ratings
Bldg. 219(X) connected load @ 219(X)-LH-MCC-001	23 kVA connected – 26 kVA design for each crest pad building.
Bldg. 219(X) main service breaker size @ 219(X)-LH-MCC-001	100 amps
Bldg. 219(X) main service feeder to 219(x)-LH-MCC-001	3#1 TW, 1#1 TW (N)
Bldg. 219(X) service transformer	75 kVA, 480V, 3-phase, 4-wire
Bldg. 219(X)1 transfer bldg. feeder breaker size	50 amps
Bldg. 219(X)1 transfer bldg. feeder size	3#4 TW, 1#8 G
219(x)-LH-MCC-001 short circuit available	2,484 amps symmetrical
219(x)1-LH-SW-002 short circuit available	1,632 amps symmetrical
219(x)-LH-LP-001 short circuit available	1,177 amps symmetrical
219(x)1-LH-LP-002 short circuit available	1,068 amps symmetrical
219(X) –LH-LP-001 lighting panel rating	60 amps
219(X)1-LH-LP-002 lighting panel rating	60 amps
219(X)-LH-T-001 lighting panel transformer rating	15 kVA
219(X)1-LH-T-002 lighting panel transformer rating	15 kVA
219(X)-LH-P-203 LCRS high flow pump motor feeder size	3#12 TW, 1#12 G
219(X)-LH-P-202 LCRS low flow pump motor feeder size	3#12 TW, 1#12 G
219(X)-LH-P-204 LDS pump motor feeder size	3#12 TW, 1#12 G
219(X)-LH-P-205 sump pump motor feeder size	3#12 TW, 1#12 G
219(X)1-LH-P-302 transfer pump motor feeder size	3#12 TW, 1#12 G
219(X)-LH-P-207 combined sump pump motor feeder size	3#12 TW, 1#12 G
219(X)-LH-UH-001 unit heater feeder size	3#12 TW, 1#12 G
219(X)1-LH-UH-002 unit heater feeder size	3#12 TW, 1#12 G
219(X)-LH-AC-001 air condition feeder size	3#10 TW, 1#10 G
219(X)1-LH-AC-002 air condition feeder size	3#12 TW, 1#12 G
219(X)-LH-MD-001 motor damper feeder size	2#12 TW, 1#12 G
219(X)1-LH-MD-002 motor damper feeder size	2#12 TW, 1#12 G
219(Y)201-LH-HT-001 leachate storage tank heat trace feeder size	2#10 TW, 1#10 G
219(Y)201-LH-HT-002 leachate storage tank heat trace feeder size	2#10 TW, 1#10 G
219(Y)1-LH-HT-003 truck loading station heat trace feeder size	2#10 TW, 1#10 G
219(X)-LH-CP-001 main control panel feeder size	2#10 TW, 1#10 G
Note: (X) = A,E	

2 ***Recommendations***

3 Building Power Supply

4 • Provide separate power distribution equipment (pad mount utility transformer, secondary service,
5 and power distribution gear) for Cell 1 and Cell 2 in order to maximize redundancy.

- Install service rated motor control center inside each crest pad building for providing service entrance, branch, and sub-feeder distribution capability, and complete motor control for various process control systems.
- Power lighting, receptacle, and facility loads from 3-phase, 4-wire lighting panel installed in each building.
- Power instrumentation from surge protected distribution center mounted inside facility control panel.
- Ground Electrode System.
- Provide and install ground electrode system for service and each separately derived system that incorporates both ground ring, ground rod, and concrete encased building rebar.
- Provide ground bus inside Process Instrumentation and Control Systems (PICS) control panels and bond to common ground electrode system.
- Bond non-current carrying metallic structure to ground electrode system that has the potential of becoming energized by attached electrical devices such as metallic conduit systems, enclosures, storage tank structures, building metal framing and siding, and above grade metallic process equipment.

5.12.4.2 Crest Pad Building Lighting

Building lighting systems were based upon I.E.S Zonal Cavity method in order to maintain an average 25-foot-candle level for process interior of each building.

Note: Interior lighting levels are based upon *IES Lighting Handbook Indoor Industrial Areas Recommended Illuminance Levels* for interior activities inside work spaces where visual tasks of medium to large contrast are to be performed on occasional basis.

Note: Exterior entrance lighting levels are based upon *IES Lighting Handbook Outdoor Site/Area Recommended Illuminance Levels* for building exterior entrances frequently visited locations.

Open Items

None

Assumptions

The following assumptions were made when analyzing building lighting.

Reflectance for unfinished rooms:

Ceilings	50 percent reflectance
Walls	50 percent reflectance
Floors	20 percent reflectance

Maintenance factor (light loss factor), interior lighting:

Incandescent lighting	.80
Fluorescent lighting	.61
HPS lighting	.70

Maintenance factor (light loss factor), exterior lighting:

HPS lighting	.70

Inputs

Crest pad buildings are unfinished industrial buildings with interior dimensions of:

Room name: Cell 1 crest pad building	Ceiling height: 11 feet
Fixture type: fluorescent two-lamp	Mount height: 9 feet

Room size: width 16 feet and length 21 feet	Area: 336 square feet

Recommendations

- Provide fluorescent low temperature starting wrap-around industrial fixtures for interior lighting of buildings.
- Use two lamps in six fixtures for 25-foot candles minimum.
- Install low pressure sodium fixture at front entrance on north exterior wall.

5.12.4.3 Leachate Transfer Building Lighting

Building lighting system was based upon I.E.S Zonal Cavity method in order to maintain an average 25-foot-candle level for process interior of each building.

Note: Interior lighting levels are based upon *IES Lighting Handbook Indoor Industrial Areas Recommended Illuminance Levels* for interior activities inside work spaces where visual tasks of medium to large contrast are to be performed on occasional basis.

Note: Exterior entrance lighting levels are based upon *IES Lighting Handbook Outdoor Site/Area Recommended Illuminance Levels* for building exterior entrances frequently visited locations.

Open Items

None

Assumptions

The following assumptions were made when analyzing building lighting.

Reflectance for unfinished rooms:

Ceilings	50 percent reflectance
Walls	50 percent reflectance
Floors	20 percent reflectance

Maintenance factor (light loss factor), interior lighting:

Incandescent lighting	.80
Fluorescent lighting	.61
HPS lighting	.70

Maintenance factor (light loss factor), exterior lighting

HPS lighting	.70

Inputs

Crest pad buildings are unfinished industrial buildings with interior dimensions of:

Room name: leachate transfer building	Ceiling height: eight feet
Fixture type: fluorescent two-lamp	Mount height: eight feet
Room size: width 10 feet and length 10 feet	Area: 100 square feet

Recommendations

- Provide fluorescent low-temperature starting wrap-around industrial fixtures for interior lighting of buildings.
- Use two lamps in two fixtures for 25-foot candles minimum.
- Install low pressure sodium fixture at front entrance on north exterior wall and low pressure sodium on south exterior wall.

5.12.4.4 Uninterrupted Power Supply (UPS) Sizing

Uninterruptible power is provided and sized to provide 25 minutes minimum of continuous backup power to the PICS programmable logic controller (PLC), operator interface unit (OIU), and local area network communication equipment.

In the event of a power failure, UPS will maintain communication with remote monitoring sites (future) and insure safe shutdown of power sensitive PICS equipment.

Open Items

None

Assumptions

None

Table 5-7. Input Data Typical for Cell 1 and Cell 2 Control Panel Loads

Description	Ratings	Comments
PLC Power Supply	180 VA	Continuous load
OIU Power Supply	60 VA	Continuous load
Ethernet Switch Power Supply	44 VA	Continuous load
Total *1.25	**355 VA**	

Recommendations

Table 5-8. Fortress Runtimes for Typical Applications in Minutes

Load (VA)	50	100	200	300	400	500	600	750	900	1050	1250	1425	1800	2250
0520-1050U	200	125	63	42	31	24	19	14	11	9.5	-	-	-	-
0520-0750U	132	75	38	26	19	14	11	8.5	-	-	-	-	-	-

Provide 1050 VA 120 Volt- 120 Volt UPS to achieve the 25 minutes minimum of continuous backup, power in the event of a power failure. Additional capacity will compensate for battery cycling deprivation.

5.13 Civil Grading

5.13.1 Waste Volume, Cut/Fill and Stockpile Requirement Calculations

The IDF is designed to provide the waste volume requirements identified by CH2M HILL. Those requirements consist of an ultimate landfill capacity for 1,177,110 cubic yards of waste and a Phase I capacity of 213,515 cubic yards of waste.

The IDF is also designed to balance the cut and fill volumes of the project. The ultimate landfill layout on the project site provides this balance. The volume balance includes excavated material, which will be used for the construction of the closure cap. Since the closure cap will be selected and designed in the future, assumptions for the cap layout and construction were made.

With a phased construction approach planned for IDF and the fact that the material balance includes backfill to construct a closure cap for the ultimate landfill, a substantial volume of material will be stored in stockpiles at the completion of construction of Phase I landfill. The Phase I landfill design volumes for subgrade cut, admix liner, drain gravel, and operations layer material were calculated using a 3-D AutoCAD model of the landfill. These volumes were used to identify the stockpile requirements to store material once Phase I construction is complete.

Potential stockpile locations are identified on the project site plan. Calculations of these volumes are included in Appendix C.12.a. Calculations in Appendix C.12.a also present confirmation of the available waste volume and cut/fill balance.

5.13.2 Phase I Access Road and Ramp Cross Section Design

Two cross sections using granular material for base and top course were designed for the Phase I landfill access roads and the access ramp into the landfill. The design reflects the estimated wheel loads and vehicles to use the facility daily. Calculations presenting the development of these cross sections are included in Appendix C.12.b.

6.0 FACILITY DESIGN AND CONSTRUCTION

6.1 Facility Layout

6.1.1 Location

The IDF will be located approximately 1,400 feet east of Baltimore Avenue and directly north of 1st Street in the 200 East Area of the Hanford Site. Phase I of the IDF landfill will measure approximately 800 feet by 1,500 feet, with its north-south axis being the shorter dimension. Leachate handling facilities will be located immediately north of the Phase I cells. The excavated depth to subgrade (not including sump depressions) will range from approximately 44 to 51 feet. Excavation will be deepest at the landfill's north end, near the sumps and along the centerline of each cell. It will be shallowest at the southwest and southeast corners of Cells 1 and 2, respectively. Stockpile locations for excavated materials will be situated east and southeast of the Phase I landfill excavation. At the completion of Phase I construction, exposed surfaces of the stockpiles and disturbed areas will be covered with a layer of topsoil, then seeded and mulched. A borrow area of soil to supplement admix preparation is located south of the Phase I excavation location.

6.1.2 Access Roads and Ramps

For access to Phase I of the IDF, waste hauler and operations vehicles will follow an access road and travel north from 1st Street. All roads and ramps at the Phase I IDF site will be constructed with crushed surfacing material for the base and top courses. The access road from 1st Street will be aligned with the landfill's west berm access road. The road will also follow the alignment of the west access berm road for the future IDF cells.

The access road will lead north, approximately 1,000 feet from 1st Street to where it widens into an intersection. At this location, a turn to the east will lead down a 5 percent grade, 800-foot-long access ramp into the Phase I landfill. The access ramp slope was selected to allow use by both waste haul trucks and the melter transporter. The grade of the access road from 1st Street was also limited to a maximum of five percent for this same reason. The access ramp into the landfill and the access road from 1st Street to the intersection area will be both 30 feet wide.

At that base of the ramp into the landfill, there will be adequate room for waste haul vehicles to turn and move the waste into the cells. The liner system will be installed to extend approximately 50 feet south beyond the estimated toe of slope of Phase I waste placement. This extension will allow waste haul vehicles to be staged or unloaded over a lined area.

At the access road intersection, continuing north will lead up a short ramp and onto the berm access road. The berm access road will be 20 feet wide on the east and west sides of the landfill. The road will widen to 30 feet at the northwest and northeast corners of the landfill and along the landfill's north side.

The wider road in these areas will allow operations vehicles to traverse around road corners and the crest pad buildings.

The access road will continue from the northwest corner of the berm access road to the Cell 1 and Cell 2 leachate storage tank facilities. A cul-de-sac area will be provided just east of the Cell 2 leachate facilities to provide a turnaround area for operations vehicles and leachate tanker trucks.

A road will also be provided to allow operation vehicles to travel south between the leachate facilities and onto the berm access road at the centerline of IDF landfill.

Future projects are being planned to upgrade the 1st Street pavement and construct an operation building north of the IDF landfill. It is anticipated that these facilities will connect to access roads designed for the Phase I landfill.

Related to permanent access roads and their use, the construction contractor will be required by the project general requirements to submit a plan, which details their use during construction. This plan will address locations and limits of stripping/grubbing, construction haul roads, stockpile/borrow areas and other construction staging areas.

6.1.3 Survey Grids

Survey grids for this project use the Washington State Plane coordinate system (South Zone–feet, NAD83 Lambert Projection). Contours are based on 200 Area topographic mapping database, provided by Hanford HGIS Department and dated 1991. A 1-foot contour interval was used on the design drawings.

As part of the Phase I landfill design, construction control points were developed for landfill and sump subgrades as well as for the anchor trenches, stormwater facilities, and the finished grades for all roads and ramps. North and east coordinates and elevations for these points are included in a survey control table on Drawing H-2-830829, Sheet 2 of 2. The control points and lines between them will provide a location grid that will allow construction of the subgrade, liner system, operations layer, and the finished grades for the IDF.

6.2 Landfill Geometry

6.2.1 Waste Volumes and Types

6.2.1.1 Volume

Two key design criteria were provided by CH2M HILL concerning waste volumes:

- Phase I of the IDF should be designed to receive a waste volume of 213,515 cubic yards, which is equal to163,250 cubic meters. CH2M HILL identified the waste volume for placement in all phases of IDF (ultimate landfill size) as 1,177,110 cubic yards, or 900,000 cubic meters.
- Both the Phase I landfill and the ultimate landfill volumes should be sized for an air space, which includes 1.5 cubic yards of clean fill for every cubic yard of waste.
- Using these criteria, Phase I was designed to provide air space for placement of 533,620 cubic yards of waste and clean fill.

6.2.1.2 Waste Types

(Note: The disposal of MLLW other than ILAW, DBVS Waste, and IDF generated waste is not permitted at this time by this permit.)

The IDF will receive waste types including ILAW, DBVS Waste, and LLW. These wastes include both contact and remote-handled wastes. As identified in the project kickoff meetings by CH2M HILL, the waste volumes (in cubic yards) are estimated to include the following:

Waste Type	Phase I	All Phases
ILAW	50,025	753,350
MLLW	57.550	146,485
LLW	105,940	277,275
Total	**213,515**	**1,177,110**

These volumes are based on waste forecast information provided by Fluor Hanford, Inc. (FH). The waste volume forecasts are updated by Hanford Site contractors on a regular basis. The volumes above represent an average between the FH 2002 Forecast and the FH 1999 (with EIS) Forecast. Short descriptions of the waste types are given below:

Immobilized Low-Activity Waste (ILAW)–The ILAW packages are stainless steel cylinders that have been filled with vitrified low-activity waste (physically similar to glass), sealed, and cooled. The source of these waste cylinders is the Waste Treatment and Immobilization Plant. The packages are 7.5 feet in height and 4 feet in diameter, and could weigh up to 22,050 pounds each.

Contact-Handled Mixed Low-Level Waste (CH MLLW)–This waste has a dose rate equal to or less than 200 mrem/h and contains radioactivity not classified as high-level waste, spent nuclear fuel or transuranic (TRU) waste (TRU is defined as concentrations of transuranic radionuclides greater than or equal to 100nCi/g of the waste matrix). The waste is also defined as dangerous (hazardous) waste in WAC 173-303.

Remote-Handled MLLW – This waste has a dose rate greater than 200 mrem/h and contains radioactivity not classified as high-level waste, spent nuclear fuel, or TRU waste. The waste is also defined as dangerous (hazardous) waste in WAC 173-303.

Low-Level Waste Category I (LLW I)–This waste contains radioactivity not classified as high-level waste, spent nuclear fuel, or TRU waste. The waste also meets the radionuclide limits for category I waste, defined in the *Hanford Site Solid Waste Acceptance Criteria* (RH, 1998). This waste may be comprised of either contact- or remote-handled waste considered low-activity waste with very low concentrations of long-lived radionuclides. This waste is not a dangerous (hazardous) waste as defined in WAC 173-303.

Low-Level Waste Category III (LLW III)–This waste contains radioactivity not classified as high-level waste, spent nuclear fuel, or TRU waste. The waste also exceeds the radionuclide limits for category I waste and meets the category III limits, defined in the *Hanford Site Solid Waste Acceptance Criteria* (FH, 1998). This waste may be comprised of either contact- or remote-handled waste considered moderate- to high-activity waste with low to moderate concentrations of long-lived radionuclides, in stabilized form that minimizes subsidence for a period of 1,000 years. This waste is not a dangerous (hazardous) waste as defined in WAC 173-303.

Remote-Handled LLW – This waste has a dose rate greater than 200 mrem/h and contains radioactivity not classified as high-level waste, spent nuclear fuel, or TRU waste. This waste is not a dangerous (hazardous) waste as defined in WAC 173-303.

6.2.2 Landfill Phases and Dimensions

The IDF will be a single, expandable RCRA Subtitle C disposal facility that provides ultimate capacity for 1,177,110 cubic yards (900,000 cubic meters) of waste. The facility is currently anticipated to be constructed in four phases. Phase I will have two cells. Only Phase I is being permitted at this time. Each cell has a floor width of approximately 543 feet and a lined floor length of 360 feet. The total floor width of the IDF will be 1,085 feet. Side slopes of the landfill will be 3:1 (horizontal: vertical). At the south end of the Phase I cells, there will be a stormwater berm/ditch system with an infiltration area. The south side of IDF will be unlined for Phase I.

IDF will be expanded by relocation of the landfill's unlined south slope from earlier phases and installation of liner system and operations layer. When expanded to its final configuration, the floor of IDF will be 1,385 feet long, measured along its north-south axis.

6.2.2.1 Depth and Length

The landfill depth for all phases of the IDF is set to accommodate four layers of ILAW waste packages, placed on end, and each layer will be covered with 3.3 feet of clean soil. In some cases, the waste packages received for placement in the mixed and low-level waste side of IDF will have heights that vary from the ILAW package dimensions. In these cases, waste heights will vary from the four layers of ILAW waste described. The total depth, measured from the top of the operations layer to the top of the cover layer over the fourth waste layer, will be 43.4 feet. This is sized for the 7.5-foot tall ILAW package dimension. However, other waste package types can be accommodated. The waste/clean fill depth (43.2 feet) will be uniform over the entire landfill floor, due to the operations layer and the top of the landfill both sloping up 1 percent from north to south. The operations layer will be flat in the east-west direction.

6.2.3 Materials Balance

The IDF was designed to achieve near soil balance. This will minimize excess soil stockpile at the end of the life of the IDF facility and minimize the cost of hauling offsite borrow material for construction. It is important to note that the soil balance was calculated for completing IDF through all its phases and the balance included soil required for construction of the final closure cap. The closure cap design was not part of the critical systems design, completed for this project.

Having a soil balance at the completion of all phases means that at the end of Phase I, a substantial amount (approximately 991,000 cubic yards) of material will be stockpiled onsite. The project design identified potential stockpile sites that were adequate in size for the material to be stockpiled. A portion of the stockpiled material will be used as clean fill during the waste placement in the Phase I cells. However, the stockpile will be replenished during the construction of cells for each subsequent IDF phase.

A description of the resulting soil cut and fill volumes can be found in Appendix C.12.a of this Design Report.

6.2.4 Erosion Control Measures

Permanent erosion control measures (for both wind and water caused erosion) will be provided for areas disturbed by Phase I construction.

Areas that are disturbed by the construction that are outside of the Phase I excavation will be stabilized with a 6-inch-thick layer of topsoil that will be seeded with grass. The south stormwater berm/ditch, the east and west infiltration areas, and the soil stockpiles will also be stabilized with topsoil and grass.

Geotextile and quarry spalls will be placed around each end of the culverts and the stormwater pipe to provide erosion protection.

Stormwater runoff will be conveyed along the south side of the access ramp and the south side of the flat area at the bottom of the access ramp, and will be discharged to the southwest corner of the excavation infiltration area. Road surfacing will reduce the erosion potential on the ramp and flat area. To prevent erosion of the south side slope adjacent to the ramp and flat area, a strip of erosion control matting will be installed on the south side slope, immediately adjacent to the ramp and flat area. Geotextile and quarry spalls will be placed in the southwest corner of the excavation pond in order to minimize the potential of erosion due to the stormwater that will be discharged from the south edge of the flat area to the top of the infiltration area.

Erosion control matting will also be placed on the shine berm to minimize the potential for wind erosion. The erosion control matting will be a plastic matting with an estimated service life at least equal to the 10-year period that the Phase I cells are expected to operate.

To reduce wind erosion, all of the side slopes of the Phase I excavation will be stabilized with a spray-on application of a soil stabilization material. Additional applications of the soil stabilization material may have to be done annually on the areas that remain exposed.

The contractor will also be required to prepare and implement a dust control plan for the construction.

6.3 Lining System Materials

6.3.1 Liner Selection Basis

WAC 173-303-665(2)(a)(i) requires submittal of an engineering report with the permit application under WAC 173-303-806(4) stating the basis for selecting the liner(s). The report must be certified by a licensed professional engineer. The intent of Section 6.3 of the Design Report is to satisfy this requirement of the WAC 173-303, Dangerous Waste Regulations.

Specific requirements to address as the basis for liner selection include:

- The liner must be constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation.
- The liner must be placed on a foundation or base that is capable of providing support to the liner and is able to resist pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift.
- The liner must be installed to cover all surrounding earth likely to be in contact with waste or leachate.
- The lining system must include a LCRS immediately above the liner that is designed, constructed, maintained, and operated to collect and remove leachate from the landfill. Design and operating conditions will ensure that the leachate depth over the liner does not exceed one foot. The LCRS shall be:
    - Constructed of materials that are chemically resistant to the waste managed in the landfill and the leachate expected to be generated, and of sufficient strength and thickness to prevent failure under the pressures exerted by overlying wastes, waste cover materials, and any equipment used at the landfill.
    - Designed and operated to function without clogging through the scheduled closure of the landfill.
    - Engineering analyses were presented in Section 5 that address the above requirements for basis of lining selection. Of particular note is Section 5.6 that addresses lining system/leachate compatibility for all components of the lining system. Compatibility of the lining system components with the chemical and radiological constituents of the expected leachate is a critical aspect of the liner selection basis.
    - Based on results of the engineering analyses presented in Section 5, the following liner sections are proposed for the IDF bottom (floor) and side slope lining systems. Section 6.3.2 provides a detailed discussion of the liner materials for the barrier components of the lining system, and Section 6.3.3 provides a detailed discussion of the liner materials for the drainage and protection components of the lining system.

Drawing H-2-830838 (Detail 1) shows the bottom liner section, consisting of the following components, from top to bottom:

- A 3-foot-thick operations layer
- A separation geotextile (polypropylene)
- A 1-foot-thick leachate collection drain gravel layer
- A minimum 12 oz/square yard cushion geotextile (polypropylene)

- A 60-mil textured primary HDPE geomembrane
- An internally-reinforced GCL
- A CDN drainage layer for the LDS
- A 60-mil textured secondary HDPE geomembrane
- A 3-foot-thick low-permeability compacted admix (soil-bentonite) liner

Drawing H-2-830838 (Detail 2) shows the side slope liner section, consisting of the following components, from top to bottom:

- A 3-foot-thick operations layer
- A CDN drainage layer for the LCRS
- A 60-mil textured primary HDPE geomembrane
- A CDN drainage layer for the LDS
- A 60-mil textured secondary HDPE geomembrane
- A 3-ft-thick low-permeability admix liner

6.3.2 Liner Materials – Barrier Components

6.3.2.1 Geomembranes

WAC 173-303-665(2)(h)(i) requires that the IDF lining system have both a primary and secondary geomembrane. The geomembrane for the IDF will serve as leachate barrier and as a flow surface routing leachate to the LCRS sump (for the primary geomembrane) or LDS sump (for the secondary geomembrane).

HDPE has been selected as the geomembrane liner material because it is generally acknowledged to have the highest chemical resistance of commercially-available liner materials, has been widely used at similar facilities, and has a high level of acceptance by regulatory agencies. Details of HDPE geomembrane compatibility with expected leachate is discussed in Section 5.6.

A nominal thickness of 60-mil has been selected for the HDPE geomembrane. A nominal thickness of 60-mil results in a minimal allowable thickness of 54-mil, as indicated in the technical specifications. Thus, 60-mil nominal thickness is the minimum required to achieve the 50-mil minimum thickness specified by Ecology guidance. Textured (roughened) geomembrane will be used to maximize shear strength along adjacent interfaces and to reduce the potential for sliding of the liner system. Analyses of the various stresses that the geomembrane is designed to withstand under construction and operational loads are presented in Section 5.5. Required material properties as a result of these analyses are included in the technical specifications.

Details of required HDPE geomembrane properties are provided in the technical specifications (see Section 02661).

6.3.2.2 GCL

A GCL will only be included in the primary bottom lining system. For the bottom lining system, both the primary and secondary liners will be a composite (geomembrane over admix liner or GCL) system. The addition of a GCL in the primary lining system will provide an extra measure of protection, exceeding the requirements of WAC 173-303-665(2)(h)(i) for a single geomembrane for the primary liner and composite for the secondary only. This will provide an extra measure of protection on the bottom flatter slopes of the IDF, where higher leachate head levels are more likely. A GCL will not be included on the side slope lining system. The 3H:1V side slopes for the IDF will result in little or no leachate head expected on the side slope lining system, thus eliminating the need for a lining system design that exceeds the WAC requirements.

Commercially-available reinforced GCL products consist of bentonite sandwiched between a woven and non-woven geotextile that are then needle-punched together. Other combinations of upper and lower, woven and non-woven geotextiles can also be manufactured and specified.

For the IDF lining system, a needle-punched, reinforced GCL with non-woven geotextiles on both sides was selected. This type GCL product was selected primarily because of the tensile strength requirements required for landfill global stability (Section 5.1.3). The tighter weave non-woven geotextile minimizes the amount of bentonite that migrates to the interface with the geomembrane, thus minimizing the potential to create a slip surface.

Details of required GCL properties are provided in the technical specifications (see Section 02667).

6.3.2.3 Admix Liner

Details of the admix design test program are provided in Sections 4.2.2 and 5.4.1. Placement and testing requirements are described in Section 5.4.2.

The admix liner will have a minimum 3-foot thick compacted soil/bentonite admixture and will be located immediately beneath the secondary HDPE geomembrane, as required by WAC 173-303-665(2)(h)(i)(B). The admix liner typically will consist of base soil mixed with a nominal 12 percent sodium bentonite, by dry weight. Mixing and processing of the base soil/bentonite admixture is required to be performed under carefully controlled conditions, using a pugmill operation.

The base soil for the admix liner will consist of natural soil, derived from the dune sand borrow area to the south of the Phase I cell (as shown on Drawing H-2-830828) or from within Phase I cell excavations. Based on the results of the limited field exploration for near surface base soil samples (discussed in Sections 4.1 and 4.2), base soil from either source will not be excavated below a depth of 5 feet bgs (after stripping) without further evaluation of the material suitability.

Base soils excavated from the dune sand borrow area or site excavation will meet the following requirements:

- The base soil will be free of roots, woody vegetation, frozen material, rubbish, and other deleterious material.
- Rocks greater than 1 inch in dimension will not comprise more than 2 percent by weight of the base soil.
- Base soil will have 20 percent minimum passing a No. 200 U.S. sieve.
- The in-place hydraulic conductivity of the admix liner will be 10-7 centimeters per second or less, consistent with WAC requirements for secondary soil liners. The upper surface of the admix liner will be trimmed to the design grades and tolerances. The surface will be rolled with a smooth steel-drum roller to remove all ridges and irregularities. The result will be a smooth, uniform surface on which to place the overlying geomembrane liner.
- Before production installation of the admix liner, a full-scale test pad of the admix liner will be conducted for both the bottom floor (horizontal) and side slope areas of the IDF. Details of the test pads are provided in the technical specifications (see Section 02666) and the IDF Construction QA Plan. The primary purpose of the test pad(s) will be to verify that the specified soil density, moisture content, and hydraulic conductivity values will be achieved consistently, using proposed compaction equipment and procedures. In-place density will be measured using both the nuclear gauge (ASTM D2922) and rubber balloon (ASTM D2167) or sand cone (ASTM D1556) methods. In-place hydraulic conductivity will be determined from a two-stage borehole permeameter (ASTM D6391). Admix liner hydraulic conductivity will be estimated from thin-wall tube samples (ASTM D1587) obtained from the test fill and tested in the laboratory (ASTM D5084). During construction, field density (e.g., ASTM D2922, D2167, and/or D1556) and moisture content (ASTM D2216) will be measured periodically. Thin-wall tube samples (ASTM D1587) will be taken at regular intervals and will be tested for hydraulic conductivity (ASTM D5084). Additional details of Construction QA testing and acceptance

during admix liner test pad and production installation is provided in the IDF Construction QA Plan.

Details of required admix liner properties and placement requirements are provided in the technical specifications (see Section 02666).

6.3.3 Liner Materials–Drainage and Protection Components

6.3.3.1 Geotextiles

Two types and weights of geotextiles will be used in the IDF project. The separation (Type 1) geotextile has a nominal weight of 6 ounce/square yard and was selected based on the ability of the geotextile to retain the soil and to prevent the soil from entering the LCRS drain gravel. Required AOS and permittivity were determined based on filter, fines retention, and clogging potential criteria. The waste disposed in the IDF is expected to contain a minimal amount of organic material, and consequently, biologic clogging is not expected to be a problem.

The cushion (Type 2) geotextile has a nominal weight of 12 ounce/square yard and was selected based on providing the required cushion protection for geomembrane on the landfill bottom (floor). The drain gravel will have the potential to produce localized stress on the geomembrane liner during gravel placement with construction equipment and under the maximum static pressure from landfill contents at full waste height with final cover. A puncture analysis was performed to select a sufficiently thick geotextile to protect the liner. This analysis included the maximum load from landfill contents and final cover, expected construction vehicle ground pressures, and maximum drain gravel particle size listed in the technical specifications.

Both types of geotextiles are specified as non-woven needle-punched and made from polypropylene material. This material was selected because of its higher chemical resistance to the expected leachate (Golder Associates, 1991a).

Details of required geotextile properties are provided in the technical specifications (see Section 02371).

6.3.3.2 CDN

The CDN is a drainage geocomposite consisting of a HDPE geonet core with a layer of non-woven polypropylene geotextile thermally bonded to each side. The CDN selected for the IDF lining system has two drainage related functions. On the side slopes, it will function as the LCRS. A CDN is selected for the LCRS on the side slope to avoid construction stability problems associated with placement of clean granular material on slopes, thereby minimizing the potential for damaging the underlying liner system. Localized placement of drain gravel is required on side slopes (as shown on Drawing H-2-830848, Section C), to provide adequate backfill and bedding for leachate collection riser piping. On the side slope and bottom lining system, the CDN will function as the LDS.

Analyses were performed to evaluate the geotextile puncture requirements for the LCRS CDN on the side slope and the transmissivity requirements for both the LCRS and LDS CDN. These analyses and discussion are presented in Section 5.7.

The analyses for CDN geotextile puncture resistance determined that the specified geotextile is adequate for resistance to puncture from overlying operations layer, under the maximum static pressure from landfill contents.

The analyses for allowable transmissivity with applied reduction factors for intrusion, creep, and chemical and biological clogging determined that a higher flow, thicker (250 mil minimum) CDN is required, due to the reduction of flow under the high normal loads in the final filling configuration.

Details of required CDN properties are provided in the technical specifications (see Section 02373).

6.3.3.3 Drain Gravel

The LCRS for the bottom liner will be located below the operations layer and will provide a flow path for the leachate flowing into the LCRS sump and sump trough. Between the operations layer and the underlying drain gravel, a geotextile layer will function as a filter separation geotextile (as discussed in Section 6.3.3.1).

The separation geotextile will prevent migration of fine soil and clogging of the drain gravel. The gravel will be a minimum 1-foot thick layer of washed, rounded to subrounded stone, with a hydraulic conductivity of at least 10-2 cm/sec, as required by WAC 173-303-665(2)(h)(iii)(B). In addition, a slotted HDPE leachate collection piping will be placed within the drain gravel to accelerate leachate transport into the LCRS sump during high precipitation events. Slots on the leachate collection piping are sized to be compatible with the drain gravel gradation and particle sizes. Details of the leachate collection piping design are provided in Section 6.4.1.

Based on review of expected subsurface conditions for the IDF, it is not likely that material meeting drain gravel is available on or near the site. Thus, drain gravel will have to be an imported material. The technical specifications require that drain gravel meet the requirements of WSDOT Standard Specification 9-03.12(4) for gradation. The technical specifications also require a performance specification for a hydraulic conductivity greater or equal to 10-1 cm/sec.

As discussed in Section 5.7.3, the minimum estimated hydraulic conductivity for the drain gravel exceeds the required (by WAC regulations) hydraulic conductivity of 10-2 cm/sec by a factor or 100 to 1,000, and the performance specification hydraulic conductivity of 10-1 cm/sec by a factor of 10 to 100. This allows for uncertainty in the empirical formulas used to predict hydraulic conductivity, and the potential for long-term reduction in hydraulic conductivity in the drain gravel, if fines from waste filling and the operations layer migrate into this layer over time.

Details of required drain gravel material properties are provided in the technical specifications (see Section 02315).

6.3.3.4 Operations Layer

The purpose of the operations layer will be to protect the underlying lining system components from damage by equipment and waste canisters during IDF construction and operation. This layer also will protect the admix liner from freeze/thaw damage and desiccation cracking. This is especially the case on the side slopes, expected to be exposed (prior to waste placement) for longer duration than the bottom (floor) of the IDF cell.

The operations layer material typically will consist of onsite granular soil from the IDF Phase I excavation. The excavated material is expected to be a fine-grained sand to silty sand with traces of gravel. The technical specifications require the material to have a maximum particle size limit of two inches or less, and fines will be limited to maximum 25 percent fines (percent passing the U.S. No. 200 sieve). Based on review of expected subsurface conditions for the IDF excavation, the majority of soil excavated from the IDF Phase I excavation is expected to be suitable for use as operations layer without processing. As discussed in Section 4, additional geotechnical exploration within the IDF Phase I limits are recommended prior to construction to verify these findings.

Details of required operations layer material properties are provided in the technical specifications (see Section 02315).

6.4 Leachate Collection System

The leachate collection system for each cell in Phase I will consist of lateral flow media built into the cell's bottom and side slope liner system, a leachate collection pipe in the center of the cell, a sump at the north end of the cell where all leachate drains, pumps and leachate transfer piping to convey leachate out of the cell, and a network of piping and storage tanks for storing the leachate for later transfer to tanker trucks for offsite disposal. Below the bottom liner and under the LCRS sump area will be an LDS sump, pump, and associated piping. All components for Phase I of the leachate collection system are designed and configured for eventual full development of the IDF through Phase IV.

The type and configuration of the leachate collection system described below has been used successfully at other disposal facilities, and a very similar facility was recently (2002) implemented at the INEEL site near Idaho Falls, Idaho. This ICDF will accept waste with radioactive characteristics and is located in a region with dry weather conditions, similar to Hanford.

6.4.1 Leachate Collection Piping

6.4.1.1 Description

Lateral drainage media (drain gravel in the bottom liner section and CDN in the side slope section of each cell) will convey leachate by gravity to the leachate collection piping and to the LCRS sump area. The leachate collection piping system in both cells will have one 12-inch diameter HDPE slotted pipe running the length of the cell centerline from south to north. This main collector pipe will be sloped at 1 percent and will convey leachate from the south edge of the cell to the LCRS sump at the north end, where the bottom liner will intersect the side slope liner. The main collection pipe will change to solid pipe at the bottom of the side slope, continue up the side slope, and terminate at a cleanout, located just south of the crest pad building. Leachate in the sump will be collected through perforated pipes for the LCRS low flow and high flow pumps, which will be 12-inch and 18-inch HDPE slotted pipe, respectively. The riser pipes will protect the pumps and separate them from the surrounding drain gravel, allow removal and re-insertion of the pumps for maintenance, and provide a high inflow-rate screen for leachate to supply the pumps. A small-diameter pipe (housing a transducer to control the on/off levels for the pumps) will run from the LCRS sump up the side slope to the crest pad building.

The slotted portion of the riser pipes will extend from the toe of the side slope to the end of the LCRS sump area. The transducer pipe will also be slotted but for a shorter distance in the LCRS sump, whereupon it will be solid for the remaining distance to the crest pad building. A solid HDPE pipe (of the same diameter as the slotted portion of the pump riser pipes) will extend from the intersection of the side slope and bottom liner to the top of the shine berm where the pipes enter the crest pad building.

Pipe cleanouts will be provided at both ends of the main collection pipe in the center of each cell. The cleanout at the north end of Phase I, near the crest pad building, will be permanently available throughout the life of the IDF to allow access for cleaning and/or video inspection. The cleanout at the south end of the cell will also be available for cleaning and access, but only during the operation of Phase I. It will be removed and the Phase II collection pipe will be butt-fused to the pipe as the Phase II cell is brought online. Ultimately, a permanent cleanout will be installed at the south end of Phase IV, to allow cleaning and inspection of half of the collection pipe, with the other half being accessed by the permanent cleanout located at the crest pad building on the north side of Phase I.

Access to the riser pipes for cleanout or inspection, in the unlikely event this is needed, will be through the access points used for removal and re-insertion of the pumps within the crest pad building.

6.4.1.2 Design Considerations

The material chosen for piping within the Phase I lined area was HDPE , made of resin meeting the requirements of ASTM D3350 for PE 3408 material, with a cell classification of 345434C or higher. Design calculations were based on this material and pipe type, which is routinely used for leachate collection and disposal facilities and other applications. The pipe material is well suited for use in disposal facilities because of its high strength, high resistance to degradation from leachate constituents, and superior characteristics compared to all other readily available pipe materials. HDPE compatibility with leachate and the presence of radioactivity in the waste overlying the pipe were evaluated and discussed previously in Section 5.6.

The diameter of the riser pipes was chosen to provide ample clearance for the pumps to be inserted and removed on a routine basis, and specifically so that the pumps will have sufficient clearance when traveling through the angle points at the intersection of the bottom liner and side slope, and clearance at the radius transition from the side slope to the crest pad building. The pumps (described in Section 6.4.3) are specifically designed for this type of leachate collection system, where the riser pipes allow insertion of pumps down a side slope and into a sump area.

Lateral drainage media in the bottom liner and side slope liner, and the leachate collection piping system were chosen and configured to meet the regulatory requirement of no more than 12 inches of leachate head buildup over the sump area of the bottom liner as a result of a 25-year, 24-hour storm event.

The slots in the slotted pipe were designed to both be compatible with the granular material in the drain gravel and to allow a high rate of flow from the surrounding lateral drainage layers into the pipe. Slots were sized at 0.128 inches wide, with five rows of slots spaced equidistant around the perimeter of the pipe, and eleven slots per foot of pipe.

The thickness of the pipes expressed as the SDR (standard dimension ratio) was chosen to resist the highest estimated load for the IDF in its final configuration, including final cover and equipment loading (internal pressure was not a factor since the pipe will convey flow by gravity, and under the expected flow rates the pipes will only be partially full). A SDR of 17 was chosen for all piping to handle the maximum estimated load. In addition, a blanket of manufactured drain gravel will be placed around and to the sides of all collection piping and compacted to a firm, unyielding condition consistent with the soil modulus values used in the pipe loading calculations.

All piping will be butt-fused for maximum strength, and all fittings, whether available molded from the manufacturer or fabricated, will have the same or higher pressure rating than the pipe. During construction, piping will be butt-fused by certified technicians, using welding equipment approved by the manufacturer. All solid pipe will be pressure tested, even though the collection piping will see little or no internal pressure during gravity conveyance of leachate.

6.4.2 Leachate Transfer Piping

6.4.2.1 Description

At each cell, the leachate transfer piping will begin with the piping from the pumps in the LCRS and LDS sumps to the crest pad building. From the crest pad building, transfer piping will connect the leachate transfer building, storage tank, and tanker truck load facility. All underground transfer piping outside the Phase I liner limits will be double contained, that is the pressure pipe conveying leachate between various facilities will be contained in an outer pipe. The pressure pipe in the center of the double containment piping will be termed carrier pipe, while the outer pipe will be termed containment pipe. In the event of a leak in the carrier pipe, the containment pipe or leak detection pipes draining the containment pipes will convey the leakage to a combined sump facility for detection, sampling, and transfer. Any accumulation of leachate in the combined sump will be pumped through a transfer pipe to the storage tank. Piping within the crest pad building, transfer building, truck load facility, and combined sump, will not be double contained because the buildings or facilities will provide secondary containment and have sumps present to remove any leachate that accumulates as a result of leaking pipes or appurtenances. Leak detection pipes draining containment pipes and the leak detection pipe from the storage tank will be single pipes because they only will convey leakage and will not function as transfer piping (required to have double containment).

The transfer piping system also will include valves, fittings, flow meters, and other appurtenances necessary for operational functions for systems described in Sections 6.4.3, 6.4.4, and 6.4.5.

6.4.2.2 Design Considerations

All transfer piping outside of buildings will meet the same requirements as the HDPE pipe chosen for the leachate collection piping (described in Section 6.4.1). Single pipe and containment pipe exposed to earth and traffic loading will be SDR 17, while the carrier pipe, that will not be exposed to earth or traffic loading, will be SDR 21, with a pressure rating of 80 psi and a safety factor of 2 for the highest expected operating pressure in the system (SDR 17 piping has a pressure rating of 100 psi). All piping will be butt-fused except for the transfer piping from the LCRS and LDS sump pumps. This pipe will be HDPE, with quick release fittings to allow removal of the pumps from the sumps. Fittings will be pressure rated and re-useable. As the pumps are withdrawn from the sumps and moved up the riser pipes, each joint in the pipe will be unhinged to allow the pipe to be removed in 8-foot sections.

Piping inside buildings will be PVC, schedule 80, with solvent welded fittings. This pipe and classification is rated for higher pressure than required with a factor of safety of 8. PVC was chosen for application inside buildings because of its relative ease of fabrication with the solvent weld joint system.

Flange connections will be used between pumps and piping; valves and other appurtenances and piping; and joints between PVC and HDPE piping. Appurtenances will include air release valves to allow purging of any air trapped in the piping system, magnetic flow meters for measuring flow to the tanker truck load output and to and from the leachate storage tanks, and valves for flow control and diversion of flow between the various facilities. The flow control scheme and control logic for the transfer piping system are described in Section 6.4.5.

6.4.3 Leachate System Pumps

Three submersible leachate pumps will be required for each cell. For convenience and operational versatility, roller-mounted pumps were selected for all leachate removal facilities. The submersible pumps are standard stainless steel well pumps that have been installed within a screened stainless steel cylinder fitted with rollers. The configuration will allow the pumps to be installed from the crest pad building within riser piping that follows the slope of the landfill until the riser piping bends horizontally to terminate within the cell sump at the toe of slope. This type of pump can be lowered into the leachate sump through the riser pipe and removed as needed, using a winch mounted within the crest pad building. Each pump will have its foot valve removed to prevent freezing or retaining of the leachate in the pump discharge piping. Advantages of this type of pump include easy access for maintenance and inspection, no power equipment required to remove/install, and its small size will lend itself to being inserted within a curved riser pipe and evacuating nearly all of the leachate within the cell sump. Each pump will have the capability to pump either to the storage tank or truck loading station.

6.4.3.1 LCRS Pumps

Two of the three submersible pumps will be installed within the LCRS sump area of each cell above the primary liner. These pumps are required to maintain less than 12 inches of hydraulic head above the primary liner, per regulatory requirements. The pumps will be installed in a 6-inch depression within the LCRS, in order to minimize the area of permanent leachate storage at pump shutoff and allow full pump operation through the 12-inch maximum liner head zone over the primary liner. Only in the localized area of the LCRS sump depression will a maximum leachate head of 18 inches cover the primary liner. The leachate head over the primary liner will be maintained at or below 12 inches in the main sump area and throughout the landfill. One low-flow pump is required for typical pumping of leachate; a high-flow pump is necessary in the event that a large storm (24-hour, 25-year storm event) exceeds the capacity of the low-flow pump.

The selection of the low-flow pump was based on the average leachate flow from the landfill, determined in the leachate production analysis (Section 5.8.1). The analysis indicated that the maximum leachate flow, based on monthly data, is approximately 13 gpm. The hydraulics of the low-flow pump was modeled and a pump was selected, based on the hydraulic characteristics of the piping system and the required flow rate, determined in the leachate system hydraulics analysis (Section 5.9.2.1). An EPG Companies, Inc. (EPG) model WSD 3-3 (or equal) with a 0.5-horsepower motor was selected for the LCRS low-flow pump.

The selection of the high-flow pump was based on the 24-hour, 25-year storm event, determined in the leachate production analysis (Section 5.8.1). The analysis indicated that the high-flow pump capacity necessary to remove the leachate per regulatory guidelines is approximately 160 gpm. The hydraulics of the high-flow pump was modeled and a pump was selected, based on the hydraulic characteristics of the piping system and the required flow rate, determined in the leachate system hydraulics analysis

(Section 5.9.2.1). An EPG model WSD 30-3 (or equal) with a 7.5-horsepower motor was selected for the LCRS high-flow pump.

6.4.3.2 LDS Pump

The third submersible pump will be installed within each cell in the LDS sump, under the primary liner and above the secondary liner.

This pump will detect and recover leachate that has leaked through the primary liner by pumping the leachate to the crest pad building. This pump was sized for low leachate generation flows.

The hydraulics of the LDS pump were modeled and a pump was selected that can produce 4 gpm, based on the hydraulic characteristics of the piping system and the required flow rate, identified in the leachate system hydraulics analysis (Section 5.9.2.1). An EPG model 1.5-3 (or equal) with a 0.5-horsepower motor was selected for the LDS pump.

6.4.3.3 Crest Pad Building Sump Pump

The sump pump within the crest pad building will be a submersible floor sump, activated by float switches within the floor sump. The function of the sump pump is to remove leachate that accumulates in the crest pad building as a result of unexpected spills or pipe leaks. The pump discharges water to the leachate storage tank via the crest pad building discharge piping.

The hydraulics of the sump pump was modeled and a pump was specified, based on the hydraulic characteristics of the piping system and the required flow rate identified in the leachate system hydraulics analysis (Section 5.9.2.1).

6.4.3.4 Leachate Transfer Pump

The leachate storage tank will be drained by using the leachate transfer pump, located in the leachate transfer building. The pump was sized to deliver a capacity of 250 gpm to the truck loading station, where it will discharge into a tanker truck. The typical volume allowed in a tanker truck is 7,000 gallons, corresponding to a loading time of approximately 30 minutes.

The hydraulics of the leachate transfer pump was modeled and a pump was selected, based on the hydraulic characteristics of the piping system and the required flow rate, identified in the leachate system hydraulics analysis (Section 5.9.2.1). A standard horizontal centrifugal pump, Paco model 30707 (or equal) with a 3-horsepower motor was selected for the leachate transfer pump.

6.4.3.5 Combined Sump Pump

The combined sump will be a 76-inch-diameter HDPE manhole with a 42 inch diameter HDPE manhole placed inside. The outer manhole will have a height of approximately 8 feet, and the inner manhole height will be approximately 6 feet. The secondary containment portion of all the buried HDPE pipelines, leachate tank, and leachate transfer building floor sump will drain to the annular space (leak detection chamber) between the two manholes. The leak detection chamber will include instrumentation to detect leachate and alarm accordingly. The sumps installed within the truck loading slab typically will collect precipitation that drains off the slab. The precipitation will be conveyed directly to the inner manhole of the combined sump, where the combined sump pump will be located. The combined sump pump then will pump the precipitation to the leachate storage tank.

The combined sump pump was conservatively sized for a capacity of 250 gpm. This large capacity was chosen based on an off-normal event that assumed the tanker truck was overtopped during leachate transfer activities, resulting in 250 gpm flowing into the inner sump. Another off-normal event considered was the remote possibility that the leachate tank primary liner failed catastrophically. This flow of leachate could eventually inundate the leak detection chamber and overflow into the inner manhole.

The hydraulics of the combined sump pump was modeled and a pump was selected based on the hydraulic characteristics of the piping system and the required flow rate, identified in the leachate system hydraulics analysis (Section 5.9.2.1). A Hydromatic model SB3S (or equal) with a 3-horsepower motor was selected for the combined sump pump.

6.4.4 Leachate Temporary Storage Tank

6.4.4.1 Tank Volume

A leachate temporary storage tank is required for each cell. The working capacity of each tank is 375,000 gallons that include a 1.5 safety factor. This volume is based on the results of the leachate production analysis (Section 5.8.1) and the leachate collection storage analyses (Section 5.9.2.4). The storage tank capacity is dependent on the net volume of leachate accumulation in the tank from flow into and out of the tank. The flow out of the tank via the leachate transfer pump is based on several assumptions, described in Section 5.9.2.4. Actual leachate transfer operations will affect the tank volume safety factor.

6.4.4.2 Tank Design

A bolted, corrugated steel tank, approximately 100 feet in diameter with a side wall height of 8 feet 2 inches, was selected for use as the leachate temporary storage tank. The tank will include a dual containment liner system that will act as the floor of the tank and will be bolted to the top of the tank side wall. The tank will be open-topped with a floating geomembrane cover to keep precipitation, debris, and wildlife from contacting the leachate.

The tank side wall will be bolted to a 1.5-foot thick, 4-foot-deep concrete ringwall to resist hydrostatic pressure of the leachate water. In addition, the top edge of the tank ringwall will include angle bracing, bolted around the tank perimeter to provide rigidity in the side wall to resist wind loads on the exterior of the tank. The maximum operating level of the tank is approximately 6 feet 2 inches; however, the tank is designed for a maximum water level of 8 feet 2 inches.

The inlet piping for the tank will be through the side wall of the tank. The inlets will all be located near the top of the tank, above the maximum leachate water operating level. This is to ensure that a siphon cannot develop in the inlet piping. Check valves will be installed throughout the system; however, if piping between the check valve and the tank leaked into the secondary containment system, there would not be an easy method of stopping the flow if the pipe was below the water surface of the tank.

The outlet pipe for the tank will be through the side wall, near the bottom of the tank. This method was chosen to provide a flooded suction for the leachate transfer pump that will provide added protection against pump damage.

6.4.4.3 Tank Liners

The tank liners will be constructed with an XR-5 geomembrane. XR-5 is a proprietary geomembrane manufactured by Seaman Corporation. XR-5 is the preferred liner of several tank manufacturers due to its higher strength properties and lower thermal expansion coefficient, as compared to HDPE geomembrane. As such, it is more readily constructible in the tank configuration, and it does not expand and contract as much as HDPE, so it's operating performance over the temperature range at Hanford should be improved. For the exposed condition at the IDF tanks, this is an important consideration. HDPE was considered for use as the tank liner system, but its high coefficient of expansion will not lend itself to the temperature extremes that the liner system will be subjected to and also it is not reinforced like the XR-5. The expansion and contraction of an HDPE liner exposed to the environment could put undue strain at the inlet and outlet connections as well as at the leak detection connection that could result in liner leakage.

Chemical compatibility of leachate with the liner system is also a consideration for liner material selection for the leachate storage tanks. As discussed in Section 5.6.3.1, compatibility testing on HDPE geomembrane was performed with synthetic leachate for the W-025 landfill with no evidence of geomembrane deterioration. With regard to leachate compatibility, XR-5 is comparable to HDPE in terms of compatibility with typical leachate constituents. The geomembrane manufacturer requires immersion testing for conclusive compatibility determination. Testing of this type has not been performed, but the manufacturer is confident that immersion testing results will be acceptable since XR-5 is generally comparable to HDPE.

To address the issue of chemical and radiation resistance for XR-5 with anticipated leachate constituents, an immersion test program is included in the technical specifications for the tank liner. Details are provided in Section 13205 of the technical specifications. This immersion testing program requires the construction general contractor to submit tank liner sample coupons to the design engineer for immersion testing, as part of the construction submittal process and certification of the tank liner.

In addition, it should be noted that leachate compatibility is not as critical an issue for the tank system as compared to the landfill liner system. The leachate tank liner system will be subject to continuous monitoring through the tanks' LDS, as is the landfill liner system. The difference is that the tank liners will be subject to routine maintenance and inspection that will be developed around liner warranty, performance observation, and manufacturer's requirements. Operation and maintenance procedures for the tank will be established that require that the tanks be drained, sediment removed, and the liner inspected for holes and seam integrity. Since liner performance guarantees are required in the technical specifications for the tank manufacturer for three years following installation, it is likely that the inspection program would be initially set up around this time frame and gradually be increased over the life cycle of the tank. Replacement of the leachate tank liner system is anticipated periodically throughout the life cycle of the landfill.

The tank lining system is a double-lined system. The primary and secondary tank liners will include a LDS beneath the primary tank liner. The LDS consists of a HDPE drainage net with a geotextile material, laminated to the drainage net that cushions the XR-5 liner. A geotextile material will also be used between the secondary liner and the inside face of the tank shell to create a cushion for the XR-5 against the tank shell and tank shell bolt heads. The bolt heads are also recessed for further liner protection.

6.4.4.4 Tank Leak Containment System

The HDPE drainage net between the primary and secondary liner will allow leachate that leaks through the primary liner to drain to the center of the tank. At the center of the tank under the secondary liner will be a depression in the underlying granular backfill that will form a shallow sump. The leak detection pipe will connect to the secondary liner at this sump location and convey leaking leachate to the leak detection chamber of the combined sump.

The tank inlet and outlet penetrations will be areas susceptible to leaks as a result of penetrations through the primary liner. Additional robust methods for sealing these locations were added over and above the typical manufacturer recommendations in an effort to make sure that these will not be points of leakage.

6.4.5 Pump Controls and System Instrumentation

The process and instrumentation diagrams for Cell 1 and Cell 2 are shown on Drawing H-2-830854, sheets 1 through 4. Detailed information regarding the instrumentation and control system, equipment listing, instrument listing, and loop descriptions can be found in the technical specifications, Section 13401 (Process Instrumentation and Control System).

6.4.5.1 Crest Pad Building

The leachate pumps within the landfill will be automatically controlled, based on leachate level set points within the cell sump. The level transducer that controls the LCRS pumps will be inserted into the sump via a slope riser pipe. The level transducer that controls the LDS pump is integral to the LDS pump. Leachate pumped by the leachate pumps will be monitored by a flow-indicating totalizer within the crest pad building. Controls will be in place to stop automatically the leachate pumps operation if alarm conditions are present for the leachate storage tank high-high level, leak alarm in the crest pad building sump, or a leak alarm in the combined sump.

The crest pad building sump pump will be automatically controlled by float switches within the building floor sump. In addition, a leak detection switch will be installed in the floor sump that will be capable of detecting small quantities of water in the sump before the float switches. This feature will add an extra level of conservatism to make sure unexpected spills are identified and controlled immediately.

Controls will be in place to stop automatically the crest pad building sump pump operation if alarm conditions are present for the leachate storage tank high-high level or for a leak alarm in the combined sump.

6.4.5.2 Leachate Transfer Building

The leachate transfer pump will be manually controlled except for automatic shut-off during specific alarm events. Controls will be in place to stop automatically the transfer pump operation if alarm conditions are present for the leachate storage tank low-low level or for leak alarm in the combined sump. Additional instrumentation (associated with the leachate transfer pump) will include a flow meter (measuring rate and total volume) and transmitter on the discharge of the leachate transfer pump. In addition, a local totalizer will be in the leachate transfer building to know exactly how much water is being transferred to the tanker truck. This totalizer will include a reset function to allow the total to be reset to zero, prior to every truck loading event.

6.4.5.3 Leachate Storage Tank

Instrumentation within the leachate storage tank will be contained within two vertical stilling wells that will penetrate through openings in the floating cover. The stilling wells will be small diameter pipe with perforations near the bottom that will allow the leachate within the stilling well to rise and fall with the level of the leachate in the tank. Analog instrumentation within one stilling well will provide a signal to the control system for alarm interlocks and constant monitoring of tank level. The second stilling well will contain discrete instrumentation for high-high and low-low alarm set point trips. The discrete instrumentation will provide conservatism in the off chance that the analog signal malfunctions, allowing the leachate level to reach extreme high or low levels.

6.4.5.4 Combined Sump

The combined sump pump will be automatically controlled by float switches within the inner manhole of the combined sump. Controls will also be in place to stop automatically the combined sump pump operation if alarm conditions are present for the leachate storage tank high-high level. A leak detection switch also will be installed within the leak detection chamber that will be capable of detecting a small quantity of water. The leak detection switch will provide a signal to the control system that automatically will shut down all the cell pumps except the combined sump pump. The pumps will be shut down because any one of the pipelines associated with the pumps could be leaking into the leak detection chamber. Operations will then need to determine which secondary containment pipeline supplied the water that drained into the leak detection chamber.

6.4.6 Process Instrument Control System (PICS)

6.4.6.1 Introduction

This section provides a summary of the PICS design and construction elements of the project, providing introduction and reference to the project layout and key design components for the following IDF facilities:

- IDF leachate collection and handling crest pad facilities (two each)
- IDF leachate storage tank and leachate transfer facilities (two each)
- IDF truck loading facilities (two each)

The PICS design identifies, specifies and integrates PICS components to automatically monitor and control IDF process control equipment and facilities including:

- LCRS
- LDS

- Crest pad and leachate transfer building environmental controls
- Leachate storage tank system
- Leachate transfer and truck loading system
- Combined sump system
- Secondary containment LDS

6.4.6.2 Key Design Components (Elements)

PICS design and construction elements of the project incorporate the following key PICS design components for each IDF facility:

- Instrumentation for continuous analog process monitoring
- Instrumentation for discrete process monitoring
- Instruments and programmed safety interlocks and alarming
- Programmable logic controller (PLC) system
- Operator Interface Unit (OIU)
- Communication Local Area Network (LAN)
- PICS application software
- Main and local control panels
- Uninterruptible power supply

6.4.6.3 Open Items

The IDF Phase I Critical Systems design documents do not identify the following items:

- Identification of communication LAN from IDF control panels to central supervisory control and data acquisition (SCADA)
- Extension of communication LAN from IDF control panels to central SCADA

These items are scheduled to be addressed during the IDF Phase I Non-Critical design of the project. As such, the following assumptions were made in order to complete IDF Phase I Critical Systems design:

- Assume 10/100 megabits per second (MBPS) Ethernet communication LAN from IDF control panels to central SCADA
- Assume fiber-optic multi-mode extension of communication LAN from IDF control panels to central SCADA

6.4.6.4 PICS Architectures

The PICS design identifies various architectures, designed to enable operators to locally and remotely interface and change program settings by the use of an Ethernet LAN. This document does not identify components and architectures to be provided and configured under the IDF Phase I Non-Critical design in order for personnel remote monitor and control processes over the LAN.

6.4.6.5 PICS Instrumentation Architecture

The PICS design identifies instrumentation architecture that consists of single variable level (submersible pressure), flow, and temperature elements and transmitters that provide continuous process data to PICS PLC and OIU architectures. Process signals from each instrument are monitored for the purpose of controlling, displaying, recording, and alarming all process data. PICS instrumentation will be wired directly into PLC input modules (i.e., Allen-Bradley 1746 I/O modules).

6.4.6.6 Instrumentation

The PICS design identifies all set-point adjustments as being programmed into the PLC via the OIU architecture. Field instruments incorporate the following signal types:

- Analog signals, current type: 4-20 mA dc signals conforming to ISA S50.1.1
- Transmitters type: 2-wire and 4-wire
- Transmitter load resistance capacity: Class L
- Fully isolated transmitters and receivers
- Discrete signals, voltage type: 24 VDC

6.4.6.7 Analog Instrumentation

The PICS design identifies flow analog instrumentation, consisting of electromagnetic flow elements and integral transmitters that will enable operators to monitor pump discharge flow for the following processes:

- Landfill LCRS pump discharge flow
- Landfill LDS pump discharge flow
- Leachate transfer truck loading station discharge flow

The PICS design identifies level analog instrumentation, consisting of submersible pressure transmitters that will enable operators to monitor liquid levels for the following:

- Landfill LCRS
- Landfill LDS
- Leachate storage tank system

The PICS design identifies temperature analog instrumentation, consisting of an element and transmitter that will enable operators to monitor temperature levels inside the following:

- Crest pad buildings
- Leachate transfer buildings

6.4.6.8 Discrete Instrumentation

The PICS design identifies level instrumentation, consisting of radio frequency (RF) admittance probes and transmitters that will enable operators to monitor discrete liquid levels inside the leachate storage tank system. The PICS design identifies level discrete instrumentation, consisting of magnetic float switches that will enable operators to monitor discrete liquid levels inside the following:

- Crest pad building sump
- Combine sump
- Combine sump interstitial

The PICS design identifies operator instrumentation, consisting of switches, indicating lights, and control relays that will enable operators to monitor the following discrete status:

- Crest pad building and control power status
- Landfill LCRS pumps ON/OFF, AUTO and FAIL status
- Landfill LDS pumps (on/off, auto, and fail) status
- Combined process sump pump (on/off, auto, and fail) status
- Leachate transfer pump (on/off, auto, and fail) status

6.4.6.9 PICS Programmable Logic Controller (PLC) Architecture

The PICS design identifies PLC architecture designed around Allen Bradley Ethernet small logic control technologies. PLC architecture consists of the following:

- PLC processor.
- PLC input/output (I/O) modules.

- PLC ancillary power supplies, chassis and cabling.
- PLC application and development software and hardware.
- The PLC processor is the microprocessor-based device that uses programmable ladder logic for implementing process monitoring and control, emulating the functions of conventional panel-mounted equipment such as relays, timers, counters, current switches, calculation modules, Proportional, Integral and Derivative controllers, stepping switches, and drum programmers.
- PLC(s) are programmed to interface with instrumentation and process motor control equipment. PICS PLC(s) are programmed to automatically operate (start/stop) all process control equipment as well as process flow totals, equipment runtime, operation alarms, equipment, and building status.
- Instrument architecture (analog and discrete control devices) interface with PLC via PLC I/O modules, installed in a common chassis with the PLC power supply.
- The type of I/O modules utilized include analog (4-20 mA) input, 24VDC discrete input, and 120VAC/ 24VDC discrete output.
- The PICS design identifies PLC application software that provides functions unique to the project and not provided by PLC system software alone, such as programmable controller ladder logic, math operations on input process variables (scaling, alarming, totalizing, comparisons).
- The PICS design identifies PLC standard system software packages that enable personnel to communicate and program PLC processor and configure I/O modules. PLC development and application software reside on the programming laptop from which the application is downloaded into the PLC processor.

The PICS design identifies communication protocols establishing data exchange between PLC, programming laptop, OIU architecture, and future remote SCADA as follows:

- Allen Bradley RS-232, RS-4585, and DF1
- Ethernet

6.4.6.10 PICS Operator Interface (OIU) Architecture

The PICS design identifies OIU architecture that allows operators to visually monitor process system data and interface with the facility's programmable logic controllers. OIU enables operators to view alarms and change process set points.

PICS OIU architecture is designed around Allen Bradley PanelView, communicating with PLC architecture over a communication local area network. OIU architecture includes:

- OIU assembly.
- Local area network copper cabling.
- OIU application and standard system software.
- The PICS design identifies OIU application software that provides functions unique to the project and not provided by system software alone. These include, but are not limited to, programmable controller ladder logic, databases, reports, control strategies, graphical display screens, and operation scripts.
- The PICS design identifies OIU standard system software packages that enable personnel to communicate and program OIU. OIU application and standard system software reside on the programming laptop from which the application is downloaded into the OIU processor.

6.4.6.11 PICS Communication LAN Architecture

The PICS design identifies communication between PLC processors, OIU, programming laptop, and future IDF SCADA over a local area network consisting of a local 10/100 MBPS Ethernet switch, local PLC, OIU LAN drivers, and a cable system. The PLC processor and OIU are addressable over the LAN, allowing each device to share data and control points between each other and future devices.

6.4.6.12 Back Up Power

The PICS design identifies UPS mounted inside each main control panel. UPS(s) was sized to enable PLC and OIU networks to maintain monitoring of process control systems during a power failure as well as provide for an orderly shutdown. UPS does NOT power process control equipment such as solenoids, instruments, motorized valves, pumps, and motors.

6.4.6.13 Control Panels

The PICS design identifies the main control panel, mounted inside each crest pad building housing PLC processor and associated I/O modules, ancillary power supplies, termination devices, UPS, and control circuit protection devices. OIU and process flow and level indicators are mounted on front doors of control panels.

The PICS design identifies local control panels, integrating discrete level instrumentation, control relays, intrinsic safety relays, and providing interlock signals between PLC architecture and MCC pump controls.

6.5 Stormwater Management

The proposed stormwater system to be constructed just south of the south end of the Phase I excavation will intercept stormwater runoff from the area to the south for the 24-hour, 25-year storm event so that it will not flow into the Phase I excavation and will discharge the intercepted stormwater into the ground via infiltration. This system will consist of the south stormwater berm/ditch, two culverts, and the east and west infiltration areas. The berm will be two feet high above the existing ground surface. The minimum combined depth of the berm and ditch will be two feet. The ditch will be V-shaped with 3:1 side slopes. The culverts will be 18-inch-diameter, corrugated polyethylene pipe with smooth interior. Geotextile and quarry spalls will be placed around each end of the culverts to provide erosion protection. The east and west infiltration areas will have bottom lengths of 220 and 225 feet, respectively. Each of the infiltration areas will have a bottom elevation of 719 feet and a bottom width of 15 feet. In order to allow access for future maintenance into each of these infiltration areas, their north and south ends will be sloped at 15 percent and surfaced with quarry spalls placed on a geotextile.

The proposed stormwater system to be constructed at the south toe of slope within the Phase I excavation will intercept stormwater runoff from the unlined portions of the excavation for the 24-hour, 25-year storm event so that it will not flow into the active cells and will discharge the intercepted stormwater into the ground via infiltration. This system will consist of the excavation stormwater berm/ditch, a stormwater pipe, one catch basin, and the excavation infiltration area. There also will be a flow path along the south side of the access ramp that will continue along the south side of the flat area at the base of the access ramp and into the southwest corner of the excavation infiltration area. The south stormwater berm/ditch will slope to drain to the east. The combined depth of the berm and ditch will be two feet. The stormwater berm will be 2 feet high at its west end, and the corresponding depth of the ditch will be zero. The berm will gradually reduce in height as the depth of the ditch increases. The berm will end when the ditch depth reaches 2 feet. The ditch will be V-shaped with 3:1 side slope on the south and 2:1 side slope on the north. The stormwater pipe will be 18-inch-diameter corrugated polyethylene pipe with smooth interior. Geotextile and quarry spalls will be placed around each exposed end of the stormwater pipe to provide erosion protection. The catch basin will be used to lower the elevation of the stormwater pipe so that there will be adequate cover over the pipe for protection against wheel loads. The infiltration area will have a bottom elevation of 678 feet, a bottom width of 15 feet, and a bottom length of 50 feet. In order to allow access for future maintenance into this infiltration area, the west end will be sloped at 15 percent and surfaced with quarry spalls placed on a geotextile.

If the water builds up in the east or west infiltration area, it will eventually flow out of the north end of the infiltration area. The water would flow overland, north along the toe of the fill for the berm access road, and continue generally northward.

If the water builds up in the excavation infiltration area so that it extends into the ditch, then the operator will have to bring in a portable pump and pump the water into the east infiltration area.

Maintenance for each of the infiltration areas, the ditches, and the ends of each of the culverts and stormwater pipes will be primarily to remove accumulated sediment and debris.

6.6 Building Systems

6.6.1 Crest Pad Buildings

The crest pad building is designed as a pre-engineered, rigid frame metal building on a slab-on grade foundation. The building slab is separated into two portions. The lower portion of the slab is where the piping associated with the leachate pipe will be contained, and the higher slab is where the electrical and control equipment will be located. The slab where the leachate piping will be located is lowered to create a containment area for the leachate. Construction joints within this area have waterstops to ensure that leachate cannot egress through the construction joints. Additionally, a sump has been placed to drain the containment area, if required. The entire floor and sump area also is to be coated to provide even greater resistance to the leachate.

6.6.2 Leachate Transfer Buildings

The leachate transfer building is designed as a pre-engineered, self-framing metal building on a slab-on-grade foundation. The metal building is supported on an 8-inch curb that travels continuously around the exterior of the building. The curb is continuous, even through the door threshold, to provide a containment area for the leachate in case of spillage. In order to maintain conformance with building code requirements, a landing is used to eliminate the curb tripping hazard at the door threshold. Construction joints within this area have waterstops to ensure that leachate cannot egress through the construction joints. Additionally, a sump has been placed to drain the containment area, if required. The entire floor and sump area also is to be coated to provide even greater resistance to the leachate.

6.6.3 Truck Loading Station

The truck loading station is designed to receive trucks to load with leachate. The station is essentially a slab-on-grade. The station is designed to contain minor spillage of leachate by sloping the floor slab towards the center and using rounded curbs at the slab entrance and exits. Two sumps will be placed in the center of the station to drain the station as required. The entire floor and sump area also is to be coated to provide even greater resistance to the leachate.

6.7 Electrical Service and Lighting

6.7.1 Introduction

This section provides a summary of the electrical design and construction elements of the project, providing introduction and reference to the project layout and key design components for the following IDF facilities:

- IDF leachate collection and handling crest pad facilities (two each)
- IDF leachate storage tank and leachate transfer facilities (two each)
- IDF truck loading facilities (two each)

The electrical design identifies, specifies, and integrates power distribution systems that incorporate transformers, breaker panels, motor control, safety switches, conductors, and lighting for the safe, reliable, and maintainable operation of IDF process and facility equipment including:

- Process equipment (leachate collection and removal pump motors, leak detection pump motors, transfer pump motors, and instrumentation)
- Building facility equipment (lighting, power outlets, heating units, cooling fans, and building sump pumps)
- Personnel and equipment safety systems (standby egress lighting, process alarm lighting, surge protection, and process piping heat trace)
- Electrical design and installation shall be in accordance with NFPA 70 (NEC, 2002)

6.7.2 Key Design Components (Elements)

Key electrical design components (elements) for each IDF facility include:

- Electrical secondary service and monitoring
- Electrical secondary service and feeder protective device coordination
- Electrical secondary service ground electrode system
- Electrical service, equipment, and associated metal structures grounding
- Electrical low voltage motor control
- Facility maintenance outlets (standard, ground fault circuit interrupter [GFCI], weatherproof)
- Facility interior, exterior, and egress safety lighting
- Facility environmental control (heating and cooling)
- Facility hazardous classification
- Process equipment heat trace, ambient monitoring, and power indication
- Facility electrical system surge and phase protection
- Materials and methods of electrical construction (i.e., conduit, wire, control and safety device, and enclosure selection)

6.7.3 Open Items

IDF Phase I Critical System design documents do not identify the following primary and secondary electrical service items:

- Exact location of primary 13.8 kV, 3-phase tie-in
- Exact value of available primary short circuit current at primary tie-in location
- Exact length of primary extension
- Exact location, size, and impedance of utility step-down 13.8 kV – 480/277V, 3-phase, 4-wire pad mounted transformer(s)

6.7.4 Assumptions to Open Items

These items are scheduled to be addressed during the IDF Phase I Non-Critical design. As such, the following assumptions were made in order to complete the Phase I design:

- Assume electrical service gear inside each Cell 1 and Cell 2 crest pad building are powered by separate pad mounted utility transformers.
- Assume pad mounted utility transformers are rated 75 kVA and are installed within 100 feet of respective Cell 1 and Cell 2 crest pad buildings.
- Assume each pad mounted utility transformer is radial fed from a common 13.8 kV primary feeder.
- Assume each Cell 1 and Cell 2 leachate transfer building is powered from electrical service gear, located inside respective crest pad buildings.
- Assume utility short-circuit contribution to be 100 MVA at 13.8 kV, three-phase.

6.7.5 Crest Pad Building Electrical Secondary Service and Metering

Electrical design identified 480 volt, 3-phase, 4-wire secondary service cables eventually powering a service-rated MCC mounted inside each crest pad building.

Type	Designation	Configuration
Cell 1 Service rated MCC	219A-LH-MCC-001	480V, 3-ϕ, 3-wire, 4-wire
Cell 2 Service rated MCC	219E-LH-MCC-001	480V, 3-ϕ, 3-wire, 4-wire

The service-rated MCC will operate as a main service gear, power distribution center, and motor control assembly. A MCC distributes 480 volt, 3-phase power to the following 3-phase equipment:

- LCRS three-phase pump motors
- LDS three-phase pump motor
- Combine sump three-phase pump motor
- Crest pad building and leachate transfer building unit heaters
- Crest pad and leachate transfer lighting panel transformers

Secondary 3-phase power is monitored by phase loss and phase reversal protection relays mounted inside MCC(s). In the event of a phase loss or phase reversal condition, the protection relay will shunt the MCC main service breaker. With main service breaker shunted (open), a UPS mounted inside each PICS main control panel will continue the operation of voltage sensitive PICS equipment (i.e., PLC, OIU, local area network communication), allowing for future remote alarming (future SCADA) and the safe shutdown of sensitive equipment.

Incoming power is also monitored through the use of analog-style voltage and current meters. Operators will be able to observe operating status of incoming power by manually selecting analog-style voltage and current meters to Phase A, Phase B, and Phase C.

MCC associated gear (frame, bussing, and feeder protective devices) were sized to adequately and safely handle the calculated design and demand operating loads, and to safely withstand calculated short circuit interrupting currents.

6.7.6 Utilization Voltages

The electrical design identified utilization voltages for the following equipment and systems:

Equipment or System	Voltage, Phase
Lighting	120 V, 1-ϕ
Heat trace	120 V, 1-ϕ
Convenience outlets	120 V, 1-ϕ
Instrumentation control circuits	24 V DC
Motor control	120 V, 1-ϕ
Air conditioner	208 V, 1-ϕ
Motors, less than 1/3 hp	120 V, 1-ϕ
Motors, 1/3 hp and larger	480 V, 3-ϕ
Unit heaters	480 V, 3-ϕ
Instrument power	120V, 1-ϕ

6.7.7 Leachate Transfer Building Electrical Service

The electrical design identified three phase motor loads inside leachate transfer buildings as being powered from MCC, located inside each crest pad building. Power will be routed from MCC to service-rated disconnect, wire-way, enclosed breaker, and mini-power center (panel/transformer assembly), located inside each leachate transfer building.

Type	Designation	Configuration
Cell 1 service-rated disconnect	219A1-LH-SW-002	480V, 3-ϕ, 3-wire, 4-wire
Cell 2 service-rated disconnect	219E1-LH-SW-002	480V, 3-ϕ, 3-wire, 4-wire

6.7.8 Crest Pad and Leachate Transfer Building Lighting Panelboards

The electrical design identified lighting panel boards installed in each IDF facility to provide 120/208V 3-ϕ, 4-wire power to non-three-phase motor loads. Lighting panelboards will be fed from 480V-120/208V 3-ϕ, 4-wire step-down transformers. Lighting panelboards inside crest pad buildings will be mounted along with step-down transformers inside MCC. Lighting panelboards (mini-power centers, along with integral step-down transformers) inside leachate transfer buildings will be wall mounted.

Type	Designation	Configuration
Cell 1 crest pad building lighting panel	219A- LH-LP-001	120/208V, 3-ϕ, 4-wire
Cell 1 crest pad building lighting panel	219E- LH-LP-001	120/208V, 3-ϕ, 4-wire
Cell 1 leachate transfer building lighting panel	219A1- LH-LP-002	120/208V, 3-ϕ, 4-wire
Cell 2 leachate transfer building lighting panel	219E1- LH-LP-002	120/208V, 3-ϕ, 4-wire

Lighting distribution panelboards will provide 120 volt power to all single-phase equipment including:

- Building lighting.
- Emergency lighting
- Receptacles.
- Main control panel.
- Instrumentation will be powered from surge-protected circuit breakers inside each crest pad building main control panel.
- Lighting distribution panelboards will provide 120/208 volt, single and three-phase power to equipment including the building air conditioner, and heat tracing for process piping.

6.7.9 Feeder and Branch Circuits

The electrical design identified feeder and branch circuit breakers and conductor's size, based upon connected and operating loads. Style of feeder and branch circuit breakers will be thermal-magnetic.

6.7.10 Raceways

480V power circuits–Standard rigid galvanized steel (RGS) in exposed locations, PVC conduit systems will be buried, RGS will be coated when conduits transition from below grade to above grade areas

120V power circuits–Standard RGS in exposed locations, PVC conduit systems buried, RGS coated when conduits transition from below grade to above grade areas.

6.7.11 Raceway Sizing, Selection, and Installation Guidelines

The electrical design identified conduit wire fill and size, based upon THW (thermoplastic, vinyl insulated building wire; flame retardant, moisture and heat resistant, 75°C, dry and wet locations) insulated conductors for wiring 600 volts and below. Minimum raceway sizes will be as follows in the designated locations:

Minimum Raceway Size:	Location:
3/4-inch	Exposed on walls and ceiling
3/4-inch	Concealed in frame construction and finished ceilings
1-inch	Underground for circuits below 600 volts, including instrumentation

3-inch	Fiber optic

The electrical design identified underground raceways assemblies as concrete duct bank constructed.

6.7.12 Wire and Cable

The electrical design identified stranded copper conductors that will be used for all wiring, except for lighting and receptacle circuits where solid copper will be used.

Minimum conductor size of No. 12 will be used for power and lighting branch circuits. Conductors installed in all branch circuits rated 100 amps or less was sized based upon NEC table for 60°C TW conductors.

- No. 12 AWG copper for lighting and receptacle branch circuits
- No. 10 AWG, minimum, wiring for all outdoor power circuits
- No. 14 AWG, minimum, for all instrumentation 24VDC discrete control and instrument power
- No. 16 AWG, minimum, shielded for all instrumentation 24VDC analog control

6.7.13 Convenience Receptacles

The electrical design identified weatherproof 20 amp duplex receptacles for indoor service, weatherproof GFCI 20 amp duplex receptacles for outdoor service.

6.7.14 Motor Control

The electrical design identified full voltage non-reversing (FVNR) combination motor starter assemblies, to be mounted inside MCC for each constant speed motor. FVNR combination motor starter assemblies will consist of thermal-magnetic, trip-molded case circuit breakers; full voltage combination starters; control power transformers; indicating lights; and control switches. All combination motor starters will be operated in AUTO mode by PICS.

6.7.15 Overload Protection

The electrical design identified each motor as being provided with thermal overload protection in all ungrounded phases. Each controller will be provided with overload heaters and controller-mounted relays with external manual reset.

6.7.16 Grounding

The electrical design identified the grounding electrode system for each IDF facility, integrating ground ring rods, and connection to building rebar. The electrical design identified electrical service neutral, and the neutrals of derived sources, electrical equipment, and PICS control panels that will be bonded to grounding electrode systems.

6.7.17 Equipment Grounding

The electrical design identified noncurrent-carrying parts of all electrical equipment, devices, panelboards, and metallic raceways that will be bonded to grounding system.

The electrical design identified noncurrent-carrying parts of all mechanical equipment, to which electrical components will be attached and may potentially become energized, that also will be bonded to the grounding system, including building metal structures and leachate storage tank.

All conduits that will be provided have an equipment grounding conductor.

6.7.18 Lighting

The electrical design identified lighting fixtures that will be installed at each IDF facility to maintain an average 25-foot candle inside each building, and 5-foot candles at entrance doorways.

Note: Interior lighting levels are based upon *IES Lighting Handbook Indoor Industrial Areas Recommended Illuminance Levels* for interior activities inside work spaces where visual tasks of medium to large contrast are to be performed on occasional basis.

Note: Exterior entrance lighting levels are based upon *IES Lighting Handbook Outdoor Site/Area Recommended Illuminance Levels* for building exterior entrances frequently visited locations.

6.7.19 Emergency Lighting System

The electrical design identified emergency illumination (battery-pack wall-mounted units or luminaries powered by integral battery-powered ballasts) that will be provided in all IDF facilities.

6.7.20 Circuiting and Switching

The electrical design identified interior process area lighting, switched to provide adequate lighting. Exterior building lighting will be controlled by photocells.

6.7.21 Heat Trace

The electrical design identified electrical heat trace for above grade process piping freeze protection. Heat trace cable will be the self-limiting type with the overall system controlled by an ambient control thermostat. Heat trace design incorporates circuit power indication.

6.7.22 Hazardous Classification

The electrical design identified the interior of the combined sump as Class 1, Division 2 group, C hazardous. The electrical design for the combined sump will incorporate materials and intrinsic safety devices compatible for the installation of electrical equipment in Class 1, Division 2, Group C hazardous locations.

6.8 Construction QA Requirements

The Construction QA Plan describes the QA activities for constructing the Phase I IDF. QA activities will be required during construction to ensure the following:

- Firm and stable foundation system for liners.
- Stability of dikes or embankments.
- Low permeability soil liners that inhibit contaminant migration.
- Geosynthetic layers that function as either a hydraulic barrier or a drainage system, depending on intended function.
- LCRS and LDS that remove leachate and control head on the lining systems.
- The Construction QA Plan has been prepared to describe the activities that will be performed during construction of the lining system, leachate collection system, and operation layer of Cell 1 and Cell 2. The Construction QA Plan satisfies the regulatory requirements and guidance established in 40 CFR 264.19, the EPA technical guidance document, *Quality Assurance and Quality Control for Waste Containment Facilities* (EPA 1993), and WAC 173-303-335.

The specific physical components that the WAC requires the Construction QA Plan to address include:

- Foundations
- Dikes
- Low-permeability soil liners
- Geomembranes
- LCRS and LDS
- Final cover systems
- The WAC requires the Construction QA Plan to include the following:
- Identification of applicable units and how they will be constructed

- Identification of key personnel
- Description of inspection and sampling activities

The Construction QA Plan is intended to be implemented by an independent, qualified Construction QA certifying engineer, familiar with EPA's technical guidance document, *Quality Assurance and Quality Control for Waste Containment Facilities,* as well as the Construction QA Plan. The Construction QA certifying engineer will be supported by other Construction QA representatives, as necessary, to implement the requirements in the Construction QA Plan and document the work.

The Construction QA Plan establishes general administrative and documentation procedures that will be applicable for selected activities of construction. The Construction QA Plan addresses only those activities associated with the soils, geosynthetics, and related liner and leachate collection system piping components for the Phase I IDF landfill. Other aspects of construction, such as transmission piping, utilities, concrete, and storage tanks will require QA testing and oversight. These requirements are not mentioned in the Construction QA Plan, but they will be included in future construction inspection documents, accompanying the bid-ready drawings and specifications.

6.9 Interface with Non-Critical Systems

Critical systems for the Phase I IDF include three primary design components:

- Liner systems
- LCRS
- LDS

In addition, the Phase I IDF detailed design also involves completing all design work required for an operable landfill.

Non-critical systems for the Phase I IDF include the following components:

- Entrance facilities, including entrance area, scales, and staging areas
- Administration and control facilities
- Waste delivery access road improvements to the IDF site from the WTP
- Waste treatment and staging areas
- Gates and fences
- Utilities including fire protection, process water, electrical power, or instrumentation cables

The IDF Phase I Critical Systems design has been prepared to interface with these non-critical systems that are necessary for operational readiness for the IDF. The following discussion details interface elements of the current design with these non-critical systems.

There is the potential for the DOE to procure an independent contractor to provide operation and maintenance services for the IDF. These services could also include the detailed design and construction of a portion or all of the non-critical systems for the facility. If this should be the case, careful consideration will be given to these interface elements in the development of performance criteria that will be included as part of any contract package for these services.

6.9.1 Entrance Facilities

Entrance facilities will control the flow of waste into the IDF. These facilities will provide for waste delivery, inspection, check-in, and final authorization for disposal into the IDF. Typically, the location for the entrance facilities is adjacent to the in-bound access road, prior to reaching the disposal area. Other factors that can influence their location include access to existing utilities and other operational facilities such as waste treatment, soil stockpiles, or staging areas. Based on the current configuration planned for the IDF, there will be room for entrance facilities to the south of the Phase I disposal area, along the western access road. Typically, these facilities require connection to such utilities as fire protection, power, and process water. Utility interfaces are discussed later in this section.

Design criteria and detailed design elements for the IDF entrance facilities have not been developed. The overall mission for the facility has expanded from handling just the ILAW packages to other wastes including Waste from the DBVS and LLW materials. This may require the entrance facilities to have expanded capabilities for waste load staging, inspection, verification, and scaling, prior to release for disposal into the IDF. This could impact the location selected for the entrance facilities, since complete development of the IDF to its full capacity will leave little room to the south of the southern perimeter berm for the facility (refer to Drawing H-2-830827).

This could require the entrance facilities to be located along 1st Street, if a permanent initial location is desired. Otherwise, a more mobile entrance area could be developed and relocated along with phased development of the facility.

6.9.2 Administration and Control Facilities

Administration and control facilities will provide the control center for LCRS operations and monitoring, as well as monitoring for LDS and other emergency systems (fire, power interruption, and HVAC controls). The administration building will service facility operations, including waste tracking and record keeping systems as well as provide for staff needs including office facilities, lunch room, lockers, and storage. Other functions that may take place in this facility area include equipment maintenance, an equipment and staff decontamination area, and equipment storage.

The proposed location of the administration building is shown on Drawing H-2-830827, to the north of the leachate storage and handling area (north of the IDF Phase I development area). This location provides quick access to the leachate control buildings and storage tanks, as well as good interface with existing utilities that will come from existing facilities to the east and west of the IDF. Power and control/communications cables will connect the administration building to the leachate control buildings (crest pad buildings, leachate pump buildings, and leachate storage tanks), as well as to other leachate control structures including the combine manholes and truck loading stations for Cell 1 and Cell 2. Additional utilities will service the administration building including fire protection, process water, potable water, communications, and power. Calculations for power supply to future facilities are provided in the *Integrated Disposal Facility (IDF) Detailed Design: Site Utilities Design Report*, (RPP-18515, Revision 1).

Design criteria and detailed design need to be established for the administration building. The expanded mission of the IDF may influence existing criteria that have already been determined for this facility as provided in conceptual design documents for the original ILAW W-520 Project. Modular units may be considered for this facility.

6.9.3 Waste Delivery Access Road

The waste delivery from the WTP will access the IDF from 1st Street and enter the IDF along the western perimeter of the landfill. Waste delivery from other areas will access the facility from one of three gates (810, 812, or 815) to the 200 East Area, as discussed previously in Section 1.
The Phase I access road is aligned horizontally with the proposed western berm of the complete IDF landfill. The vertical alignment of Phase I access road coordinates with the existing topography of the site between 1st Street and the Phase I landfill area, to minimize cut and fill requirements for this road construction. As such, the Phase I vertical alignment does not follow the vertical alignment of the future western perimeter berm of the landfill and will need to be modified in future expansion phases.
All-weather pavement for the Phase I road as well as for 1st Street will need to be completed as part of non-critical design. It is anticipated that pavement will be asphalt concrete pavement.

Access for waste haul vehicles will require upgrades to 1st Street to be designed as part of non-critical systems. Design criteria for this upgrade will be based on the anticipated haul vehicles and wheel loads for the various wastes to brought to the facility. From the Phase I Critical Systems design, the melter transport vehicle represents the most restrictive design condition for the road in terms of axle load and radius/grade limitations. However, there are also substantial wheel loads and larger volumes for ILAW package transport vehicles and other MLW and LLW wastes.

It should be noted that there will be a significant grade differential between the southern end of the IDF perimeter berm and the existing 1st Street road grade. The western berm climbs at a uniform 1 percent grade to the south. As such, it will have an elevation of approximately 741 feet at the southern perimeter road. The existing grade of 1st Street at the western perimeter of the IDF is approximately 734 feet, and so 1st Street will need to be raised to make this transition and keep vertical road grades at a maximum of 5 percent to accommodate the melter transport vehicles.

6.9.4 Waste Treatment and Staging

Currently, no waste treatment facilities have been planned for the IDF. Consideration of waste treatment may be necessary as part of the IDF's expanded mission to take mixed wastes and low-level wastes from both onsite and offsite sources, depending on the waste acceptance criteria that are established for the facility. Waste staging areas are associated with waste receipt and inspection activities, as mentioned previously. Staging and storage areas may also be needed for waste treatment as well. Design of non-critical facilities may need to consider development of these waste treatment and staging areas.

During Phase I operation, there is adequate area south of the Phase I landfill area for treatment and staging. Some staging also can occur within the landfill itself that offers the advantage of occurring over lined areas with leachate collection systems in place. However, as wastes are placed and cell lifts become full, staging areas may be limited until new lifts are ready for waste placement. Regulatory requirements for waste staging and storage may also impact location and operational requirements for these areas.

6.9.5 Gates and Fences

The IDF is being developed within the 200 East area of the Hanford Site, that has controlled access with a perimeter fence and access control gates (refer to Figure 1-1). As such, it is currently not anticipated that additional fencing and gates will be required for access control to the facility. However, operationally it may be determined that a perimeter fence and additional gates may be warranted for isolation of the IDF from adjacent existing facilities and, if so, these need to be designed during implementation of non-critical design components. Site standards for fences and gates would be followed for this design.

6.9.6 Site Utilities

As mentioned previously, site utilities are included in non-critical systems design. Site utilities will interface with existing utilities that service facilities in the 200 East area. As such, substantial coordination will be required to locate these utilities, determine the best interface tie-in location, and bring these to the IDF site. Key utilities that are needed for the IDF include:

- Power to buildings and operating systems, as well as to area lighting
- Communication between administration building and operating systems, as well as from the IDF to other area networks
- Fire protection water
- Process (non-potable) water for operations and facility construction
- Potable water

Power requirements for leachate control and monitoring systems have been designed during this Phase I Critical Systems design. Access vaults to power and control systems are provided outside of both crest pad buildings (shown on Drawing H-2-830858). It is anticipated that the administration building will connect at these access vaults and will provide power for system operation and an Ethernet connection for controls. Transformer design for bringing power from the site to the administration building (and to leachate control facilities) will be performed during non-critical design, as will design of the Ethernet connection and administration control systems. Calculations for power supply to future facilities are provided in the Integrated Disposal Facility (IDF) Detailed Design: Site Utilities Design Report, (RPP-18515, Revision 1).

Utility corridors need to be developed to bring these utilities to facility areas. It is recommended that these corridors be developed outside of landfill embankment areas and access roads, to allow for uninterrupted waste placement and facility operation, for future landfill phase development, for protection of liner system anchor trenches, and for protection of utilities from heavy wheel loads. In addition, the future final cover of the IDF is located over the perimeter embankments and catches existing ground at the outside toe of the embankment.

7.0 OPERATING PROVISIONS

7.1 Waste Placement

7.1.1 Introduction

To establish a baseline for design, construction, and operation of the IDF, a plan for filling the landfill cells was developed. This plan was developed mainly to ensure that landfill configuration and size as proposed for the IDF Phase I Critical Systems were adequate for safe placement of the ILAW, waste from the DBVS, and LLW, both remote handle and contact handle, that will be placed in the Phase I development. The proposed configuration and size of the IDF Phase I landfill are identified in Section 6 of this report.

The drawings that show the waste placement plan are included in Appendix D.1. This plan was based on the concept of completely filling the first lift in both cells before beginning filling of the succeeding lift. The plan represents one approach to filling the cells within the proposed configuration. It is possible that other approaches, such as proceeding to a subsequent lift before completely filling the previous lift, also are workable, but development of the plan did not consider alternative methodologies to fill the cells. Development of the plan is also based on conformance with the operational procedures identified for the Base Alternative in Appendix K of the *Conceptual Design Report for Immobilized Low-Activity Waste Disposal Facility, Project W-520* (RPP-7908, Revision 0), (CDR).

This waste placement plan is intended to meet the applicable functional criteria identified in the *System Specification for Immobilized Low-Activity Waste Disposal System* (RPP-7303, Revision 3). "As low as reasonably achievable" principals (keeping radiation exposures to as low as reasonably achievable) are embodied in the waste placement plan that was developed. Because of the area available for waste disposal in each cell, the plan provides the capability to relocate filling operations to another area within each cell, if an event occurs that causes operations to halt temporarily, placing waste packages at the current working position. This will allow waste package placement to continue while the situation that caused the operations to cease is resolved.

7.1.2 Phase I Configuration

Under the proposed configuration for the IDF Phase I, there will be two cells, identical in size. One cell will be for disposal of ILAW and waste from the DBVS; the other cell will be for disposal of LLW. This waste placement plan proposes disposal of ILAW and DBVS waste Cell 1 and disposal of LLW in Cell 2. Provisions are included for disposal of both remote handle and contact handle waste in each cell.

The configuration of the IDF Phase I development as it will exist at the completion of construction, prior to beginning filling operations, is shown in Appendix D, Drawing D.1-1. The initial operations layer, placed as part of Phase I construction, will cover the entire bottom liner and LCRS. The top of the operations layer will be level in the east-west direction and slope down at 1 percent from the south to the north. The operations layer will extend up the west, north, and east side slopes. Access to the facility will be from 1st Street along the western site boundary. An access ramp from the southwest corner of Phase I will lead down the south excavation slope from the west side to the bottom of Phase I and connect to the top of the operations layer near the south east corner of Cell 2.

7.1.3 Waste Receipts

As stated in Section 6.2, the IDF will receive ILAW and Waste from the DBVS. The volumes stated in Section 6.2 are based on waste forecast information provided by FH. The waste volume forecasts are updated by Hanford Site contractors on a regular basis. Actual waste receipt rates at the IDF will likely vary from the estimated amounts. Depending on the receipt rate of ILAW and DBVS waste versus the receipt rate of LLW, each lift of Cell 1 and Cell 2 may fill at different rates. The waste placement plan can accommodate differing rates of waste receipt because filling in subsequent lifts in each cell could be begun at different times as soon as the prior lift was complete. The cell that has the higher waste receipt rate will fill faster than the other cell and will determine the time when subsequent phases of development will need to begin so that additional disposal capacity is available when it is needed.

7.1.4 General Waste Placement Procedures

The discussion of waste placement in this plan is based on placement of the uniform height ILAW packages using remote handle. Some adjustments may need to be made for the variable height LLW containers and for contact handle waste, but in general, the waste placement concept will be the same for all types of waste.

The configuration of IDF Phase I provides a height sufficient for four layers of ILAW packages, each covered with one meter of operations layer soil to provide shielding to operations personnel during waste package placement. LLW, which will be in variable height containers, can be accommodated within each of these four lifts. However, in some cases the LLW containers may exceed the lift height and, therefore, will not be completely covered by placement of the operations layer soil. In these cases, it may be necessary to mound cover soil around the individual projecting LLW containers to provide sufficient cover for shielding until they are completely covered by subsequent lifts.

Each lift will contain multiple ILAW package arrays that span the width of each cell. The packages will be placed in close-packet hexagonal arrays, with placement tolerance averaging 10 centimeters (4 inches) center to center. As the packages are placed in the cell, the array will proceed along the width of the cell. The earth cover will proceed shortly behind the advancing package array, the distance behind the front package limited by the repose slope of the fill soil. The array width (number of columns of packages) will be limited according to the amount of radiation generated by the total number of packages that can be exposed. The CDR indicates that even at some distance from the advancing array, the dose rate becomes a concern when the array approaches more than ten or twelve packages in width.

Off-loading of the ILAW packages and other waste containers will take place in the cell. A standard, manually operated, rubber-tired crane will off-load packages, move temporary shielding walls (concrete blocks), and place the interstitial fill between the packages using a hopper. In the CDR, the total weight of the shielding bell, package grapple, load cell, hooks, and other rigging is estimated at 20 metric tons (23 tons). The crane, as identified in the CDR, will be a Grove GMK 5100, a 108 metric ton (120 ton), rough terrain rubber-tired crane with a telescoping boom and a maximum reach of 15 meters (50 feet), with a load of 20 metric tons (23 tons). Pad loads could exceed 55 metric tons (60 tons) when placing an ILAW package at the maximum allowable reach. Dunnage required under each outrigger pad of the crane for lifts of this size has been determined to be 60 square feet, when operating directly on the base operations layer at its point of minimum thickness over the bottom liner system. Dunnage requirements for subsequent lifts would be less, but have not been determined. Refer to Section 5.5.5 and Appendix C.5.e of this Design Report for dunnage requirement calculations.

7.1.5 Moveable Shielding Wall

With off-loading operations in close proximity to the advancing package array, a moveable shielding wall will be set up between the crane and transporter operations and the placed packages (CDR, Drawing No. ES-W520-BASE). With the 15-meter (50-foot) maximum reach of the crane, the shield walls will have to be moved after every five rows of packages are placed. For a ten-package-wide-array, the wall will need to be relocated after fifty packages have been deposited, or about every eight days during Phase I.

To prevent the crane crew from receiving a high exposure rate, a new shield wall will be erected before the first shield wall is removed. A remote grappling system will be required to prevent rigging of the previously placed shield wall from causing high dose rates to operations personnel. Even then, the amount of time it will take to move the wall is estimated in the CDR to be 26 hours, four to five shifts, or a little less than two days when operating a full 24 hours per day.

An alternative to the movable shielding wall is to use contact handle waste to construct the shielding wall and to leave it in place after placement of each ILAW array rather than moving it. This can reduce operations labor and expenses. It can also result in the use of less cover soil because the space between the package arrays will be partly filled with contact handle waste, rather than with all soil.

This alternative needs to be considered further when developing the operations plan for operating the disposal facility.

7.1.6 Typical Array Size

The moveable shielding wall set up between the crane and transporter operations and the placed package configuration will limit the proximity of package placement to between 15 meters (50 feet) and 7.5 meters (25 feet) of the crane. The 7.5 meters (25 feet) usable range of the crane reach, working over the shielding wall, and the ten or twelve maximum package width (because of dose rate limitation) determines the nominal array size that can be placed by the crane from a single set point. The 1.22 meters (4 feet) diameter ILAW packages will be staggered in the array to minimize the space between the packages. A column that is five packages deep can fit within the 7.5 meters (25 feet) available range of the crane reach while working over the shield wall. A width of ten packages is within the reach of the crane and is less than the allowable limits for the dose rate. Allowing for a 10 centimeters (4 inches) average tolerance in package placement, the five-row by ten-package-wide array is roughly 6 meters (20 feet) deep by 13.3 meters (44 feet) wide. A typical array is shown in Appendix D, Drawing D.1-1.

7.1.7 Cover Soil

Prior to the shield wall being relocated, the crane will place interstitial soil material between the packages, using a hopper. The filling operation is expected to take about one shift, according to the CDR, using up the balance of the two days needed to move the shield wall. To make up the time spent moving the shield wall and placing the interstitial fill soil, the average rate of package placement will have to be increased to seven packages per day for five days, according to the CDR.

While the shield wall is being relocated, a soil cover will be placed over the packages from on top of the lift of previously placed packages. Dump trucks will drive over the previously covered portion of the array and back up to near the edge of the packages that are still exposed and dump a load of fill soil for spreading by a bulldozer. The soil will be spread over the top of the top and exposed side of the array. The side slope from soil, cascading off the top, will be formed in no less than 1.5 H: 1V for reasons of safety, and will use approximately a 5-meter (16-foot) wide space between lines of arrays. Approximately 300 cubic meters (400 cubic yards) of soil will be required to cover the top and side of the five-row-deep by ten-package-wide array. The cover soil will be held back from the advancing end of the array so that the toe of the cover soil does not extend beyond the outer package in the array. This will allow the next array to be placed in close proximity to the previous array. After the bulldozer spreads the soil to a somewhat uniform 1-meter-plus thickness over the packages, a sheepsfoot-style compactor will make several passes to consolidate the fill soil. The cover soil effort will take approximately 12 hours or two shifts, as estimated in the CDR, and will take place at the same time that the portable shield wall is being relocated.

7.1.8 Failed Melter Disposal Area

(Note: Disposal of failed melters is not permitted at this time by this permit.)

Failed melters can be disposed of as MLLW in Cell 1. A failed melter disposal area is provided on the bottom of Cell 1 at the southern toe of the waste lifts. Disposing of the failed melters in this area would eliminate placing them within the lifts along with the ILAW packages and other MLLW.

7.1.9 Access Ramps

Two 30-foot wide access ramps will be built into the south slope of the waste lifts to accommodate the movement of transport vehicles and equipment from one lift to the next. A third access ramp will be built through the north shine berm onto the top of the third lift to accommodate transport vehicles and equipment during the construction of Phase II, when the access ramp leading down the south excavation slope to the bottom of Phase I will be removed.

The access ramp into Cell 1 and the access ramp from the north side would have a maximum slope of 5 percent to accommodate failed melter transporters, if it becomes necessary to dispose of the melters in the waste lifts rather than in the designated area at the bottom of Cell 1. The access ramp into Cell 2 would have a maximum slope of 8 percent that would accommodate the ILAW, DBVS containers, and LLW waste transporters. The access ramps at the bottom of Phase I would have minimum outside turning radii of 75 feet, to accommodate the failed melter transporters. The dimensions of the access ramps provide flexibility to accommodate the various waste haul vehicles that could use the ramps.

7.1.10 Filling Lift 1

Filling of remote handle ILAW and DBVS waste in Cell 1 will begin in the northwest corner and proceed to the southeast. Filling of remote handle LLW in Cell 2 will begin in the northeast corner and proceed to the southwest. Filling of contact handle LLW will begin in the northwest corner of Cell 2 and proceed southeast (see Appendix D, Drawing D.1-2). This filling approach places the remote handle wastes farthest apart from each other, with contact handle wastes between them, and eliminates the need for additional shielding provisions that would be necessary if the two remote handles wastes were located adjacent to each other. This filling approach will be continued in the three subsequent lifts.

Nearly all of Lift 1 can be filled with the crane and transporters, operating from the top of the first operations layer. A 5-meter (17-foot) wide separation will be maintained between Cell 1 and Cell 2 to separate the ILAW and DBVS waste from the LLW. This separation area will be filled with soil. Using a low permeability soil in this area will maximize separation of leachate between the two cells. Two access lanes (ramps) will be maintained into the cells for transporter access. The transporters can turn around within the cells until the packages are within 7.5 meters (25 feet) of the area needed for the unloading operations.

Before the space for filling Lift 1 from the top of the first operations layer is consumed, the two access ramps will be extended with soil and contact handle waste to the top of Lift 1. The crane and transporters will go to the top of Lift 1 and will finish placing the remainder of the Lift 1 waste packages from the top (see Appendix D, Drawing D.1-3). At this point, it will also be possible to begin using the failed melter disposal area (also shown on Drawing D.1-3).

7.1.11 Filling Lift 2

Lift 2 will be filled similarly to Lift 1 (see Appendix D, Drawing D.1-4). This filling approach will continue the pattern that was established in Lift 1. Nearly the entire lift can be filled with the crane and transporters operating on the top of Lift 1. The 5-meter (17-foot) wide soil-filled separation will be maintained between Cell 1 and Cell 2 to separate the ILAW and DBVS waste from the LLW. The two access ramps will be maintained into both cells for transporter access. The transporters can turn around within the cells until the packages are within 7.5 meters (25 feet) of the area needed for the unloading operations. Before the space for filling Lift 2 from the top of Lift 1 is consumed, the two access ramps will be extended with soil and contact handle waste to the top of Lift 2. The crane and transporters will go to the top of Lift 2 and will finish placing the remainder of the Lift 2 waste packages from the top (see Appendix D, Drawing D.1-5).

7.1.12 Filling Lift 3

Lift 3 will be filled similarly to Lift 2 (see Appendix D, Drawing D.1-6). Nearly the entire lift can be filled with the crane and transporters operating on the top of Lift 2. The 5-meter (17-foot) wide soil-filled separation will be maintained between Cell 1 and Cell 2 to separate the ILAW and DBVS waste from the LLW. Two access ramps will be extended into the cells for transporter access. The transporters can turn around within the cells until the packages are within 7.5 meters (25 feet) of the area needed for the unloading operations. Before the space for filling Lift 3 from the top of Lift 2 is consumed, the two access ramps will be extended with soil and contact handle waste to the top of Lift 3. The crane and transporters will go to the top of Lift 3 and will finish placing the remainder of the Lift 3 waste packages from the top (see Appendix D, Drawing D.1-7).

7.1.13 Filling Lift 4

Lift 4 will be filled similarly to the previous three lifts, but with a few differences (see Appendix D, Drawing D.1-8). Most of the lift can be filled with the crane and transporters operating on the top of Lift 3, using the access ramps from the south. However, only the easterly access ramp from the south is planned to be extended to the top of Lift 4 for transporter access. The westerly access ramp from the south will not be extended because, as shown on Appendix D, Drawing D.1-9, it would reach the top of Lift 4 too close to the west side slope to accommodate an adequate turning radius for the transport vehicles. The access ramp will be blocked by waste placement in Cell 1. However, with some minor adjustment in its location and/or increase in its slope, it will be possible to extend the access ramp into Cell 1, if desired. Also, at some point during the filling Lift 4, construction for Phase II to the south will begin, and the access road from the south will be removed from service.

Prior to the westerly access ramp becoming blocked with waste and the access road from the south removed for construction of Phase II, a third access ramp will be constructed from the north down onto the top of Lift 3 to provide additional access. This access ramp will maintain separation between Cell 1 and Cell 2, to separate the ILAW and DBVS waste from the LLW. The transporters can turn around within the cells until the packages are within 7.5 meters (25 feet) of the area needed for the unloading operations.

Before the space for filling Lift 4 from the top of Lift 3 is consumed, the easterly access ramp will be extended with soil and contact handle waste to the top of Lift 4, and the access ramp from the north will be graded out onto the top of Lift 4. The crane and transporters will go to the top of Lift 4 and will finish placing the remainder of the Lift 4 waste packages from the top (see Appendix D, Drawing D.1-9). Completion of Lift 4 will end the filling operations in Phase I. The configuration at the end of Lift 4, prior to placement of the final cover system, is shown on Appendix D, Drawing D.1-10.

7.1.14 Transitioning Between Lifts

As the available operating space in a lift gets smaller, operations efficiency will decrease to a point where it will become necessary to move part of the operations to the next lift before the active lift is completed. This will allow completion of each lift, using selected waste that will be easier to handle in the remaining space available on the lift. An example of this would be to use only contact handle waste to complete the filling of each lift while operating on the top of the lift that is being completed (see Appendix D, Drawings D.1-3, -5, -7, and -9) and sending all remote handle waste into the next lift.

7.1.15 Planning for Phase II and Operations During Phase II Construction

Phase II will need to be constructed and ready for operations sufficiently ahead of completion of filling operations in Lift 4 of Phase I to allow a smooth transition without operational constraints. Planning, design, and construction of Phase II may require several years. Phase II should be planned to be ready for operation at least six months, and preferably one year or more, before Lift 4 in Phase I is anticipated to be completed. This will provide a reasonable margin for changes in the incoming waste quantities and other variables while still having Phase II ready for operation, prior to reaching capacity in Phase I.

While Phase II is under construction, the access road on the west will be out of service for a period of time and the access ramp on the south into Phase I will be removed. During this time, it will be necessary for all waste transport vehicles to enter Phase I, using the access ramp on the north side. As currently designed, some access roads on the west and north sides of Phase I that normally would be used to reach the north access ramp might not accommodate all of the transport vehicles. In particular, the berm access road on the west side of Phase I and the access roads around the leachate storage tanks on the north do not have widths and turning radii as large as required by the waste transport vehicles. These roads would have to be widened and their turning radii increased to meet the requirements for transport vehicles, particularly the failed melter transporters.

7.2 Operational Interfaces

Operations and maintenance procedures will be prepared in the future as a separate project. These procedures will address operations, monitoring, and maintenance activities for the IDF.

This section of the Design Report presents important operational interfaces that have been identified by the design team. These interfaces should be considered during preparation of the operation and maintenance procedures. The interfaces are grouped by three categories–landfill excavation, liner system, and leachate handling system.

7.2.1 IDF Landfill Excavation and Related Subsystems

Operational interfaces for the landfill excavation and related subsystems include the following:

- Due to the containerized nature of the waste, the landfill is designed to be filled in a bottom-up fashion in four or more layers. The number of layers will depend on waste package size. Some waste packages may be larger in dimension than the ILAW packages. Operational procedures should be developed to accommodate various package sizes and their placement.
- Clean fill placement between waste packages must be done to minimize the potential for future consolidation and potential subsidence.
- Operations layer on side slopes of IDF will be monitored for material loss due to wind and water erosion. Lost material should be replaced. Annual application of spray-on type soil stabilization material to exposed areas of Phase I IDF should be considered.
- Shine berms should be monitored for erosion and height and should be repaired as necessary. Erosion control matting on the berm will be maintained and repaired or replaced if damage occurs.
- Stormwater control facilities should be maintained annually. Maintenance would include debris removal from the ditches and application of weed control. Periodically, if capacity of infiltration areas is diminished due to collection of fines, fines removal will be necessary. To maintain infiltration capacity, no other vehicle access should be allowed into these areas.
- Stormwater accumulation in the in-cell excavation infiltration area should be visually monitored. Pumping of the area may be necessary if accumulation becomes significant (near liner levels) in wet weather seasons. Periodically, if capacity of infiltration areas is diminished due to collection of fines, fines removal will be necessary. To maintain infiltration capacity, no other vehicle access should be allowed into these areas.
- Due to the heavy wheel loads on the access roads and ramps, gravel surfacing will be maintained with regular maintenance. Maintenance activities may include addition of more top course material, and grading and compaction of this material.
- Active faces of stockpiles will require periodic application of spray-on soil stabilization material.

7.2.2 IDF Liner System

Operational interfaces for the lining system include the following:

- Only equipment with ground pressures less than 4,400 lb/ft should be used for construction and maintenance on the side slopes, when operating directly on the operations layer. Bulldozers or other equipment may operate on the side slopes until a rain event in excess of 0.15 inches per hour occurs. In that event, equipment should be kept off the side slope (directly on the operations layer) and should not be permitted to operate on slopes until two hours after the end of the rainfall event. The precipitation event applies to both the lined slopes and the unlined slopes at the southern end of the Phase I cell.
- For equipment on ramps, equipment should be kept a minimum of 2 feet away from the edge of ramps, to avoid localized sloughing of the ramp edges.

- When operating equipment or placing waste on the operations layer above the lining system, care should be taken to avoid damaging the liner. Special care will be necessary for equipment operation on the side slopes.
- Any loads placed on the surface of the first operations layer must be examined to verify that they do not create loads on the lining system in excess of the allowable GCL bearing capacity. As an example, different types of waste other than canisters should be examined as the waste plan is more fully developed. Care should also be taken to avoid impact loading, such as dropping a canister.
- For static loading (such as for a barrier wall), refer to the discussion in Section 5.2 and Appendix C.2.
- For operational/equipment loading, refer to the discussion in Section 5.5.5 and Appendix C.5.e to determine applicable load limits and crane dunnage requirements.

The waste plan, as it is developed, should be followed for placement and density requirements. Any revisions to the proposed waste filling plan (discussed in Section 7.1) should be reviewed by the design engineer, to evaluate impacts on the waste/fill global stability analyses (Section 5.1.3 and Appendix C.1.c).

As part of the waste/fill global stability analyses, the waste mass was considered internally stable for this design effort. Internal waste mass stability is a function of the waste filling approach. There are numerous options available to stabilize the waste through operational methodologies, such as providing a greater soil buttress on the open 3:1 south slope. During subsequent design phases, the internal stability of the waste should be evaluated in conjunction with the waste filling plan.

7.2.3 IDF Leachate Handling System

Operational interfaces for the leachate handling system include the following:

- Coordinate with Liquid Effluent Retention Facility (LERF) for leachate hauling and removal of leachate from tanks to satisfy the 90-day accumulation period (Treatment capacities at LERF and leachate flows for critical periods should also be coordinated. See Section 5.9.2.4 for additional leachate hauling constraints.)
- Use leak detection history for leachate storage tanks, during the operation of IDF, to manage and plan for replacement of tank liner system and temporary storage required during its replacement.
- Periodic preventative inspection and maintenance for all rotating equipment should be scheduled.
- For leachate tanks floating covers, rain or snow will need to be pumped off with the manufacturer-included sump pump (mounted on side of tank). Water should not be allowed to accumulate except at the perimeter of the floating cover. Excessive water may prevent vent operation and cause mixing between precipitation water and leachate on top of the cover.
- An adequate store of critical spare electrical and mechanical parts should be maintained.
- All valves should be exercised at least annually.
- A small “contractor-type” trash pump with hose should be kept on hand that can be used to pump from the leak detection chamber within the combined sump to its inner sump.
- Periodically, test operation of the combined sump pump should be done.
- Annual testing of all leachate pumps for proper operation should be scheduled.
- Regular verification of level transducer calibration in cells should be done.
- Prior to winter months, proper operation of all heat tracing system should be checked.
- Periodic testing of all control relays, switches and contacts should be scheduled.
- Additional operational interface items will be developed, based on completion of design of the control system for the leachate handling system. This will be part of the IDF administration building design.
- Maintenance should be provided in accordance with manufacturer’s recommendations.

7.3 Leakage Response Action Plan

WAC 173-303-665(9) regulations require the owner of the operator of a landfill unit to have an approved Response Action Plan (RAP) before receipt of waste. The RAP is a site-specific plan that establishes actions to be taken if leakage through the upper (primary) lining system of a landfill exceeds a certain rate. The intent of the RAP is to assure that any leachate that leaks through the primary lining system will not migrate out of the landfill into the environment.

A key element of the RAP is the ALR, a threshold value which triggers the responses described in the RAP, but below which no special actions are required. Because landfill liner systems have not yet been perfected, a small amount of leakage through the primary liner generally occurs, despite the use of best available materials, construction techniques, and QA procedures. (This leakage is collected by the LDS system and removed from the landfill.) Hence, the ALR is set at some level higher than normally expected leakage rates to serve as an indicator that the primary lining system is not functioning as expected. Exceeding the ALR may reflect serious failure of the primary lining system and indicates the need for investigation and possibly corrective action while the problem is still manageable.

This RAP has been prepared in accordance with requirements of WAC 173-303-665(9). The requirements for determining the ALR are contained in WAC 173-303-665(8) and EPA guidance document, *Action Leakage Rates for Leak Detection Systems* (EPA 1992a).

The following sections establish the ALR and discuss response actions to be taken if the ALR is exceeded.

7.3.1 Action Leakage Rate

Section 5.11 provides a detailed discussion of the analysis to determine the ALR into the LDS for the IDF. Based on this analyses, the ALR for each IDF cell is 206 gallons per acre per day, or approximately 1,800 gallons per day per cell (each cell area is approximately 8.5 acres). This value includes a factor of safety of 2 in accordance with EPA guidelines (EPA 1992b). It is also much lower than the LDS pump capacity. Details of the calculation are presented in Appendix C.10.

In accordance with WAC 173-303-665(8)(b), the flow rate used to determine if the ALR has been exceeded will be calculated as the average daily flow rate into the sump, expressed as gallons per acre per day (unless Ecology approves a different calculation). This calculation will be performed on a weekly basis during the active (operational) life of the landfill, and monthly after the landfill has been closed. Post-closure frequency may be reduced if only minimal amounts of leachate accumulate in the LDS sump. As outlined in WAC 173-303-665(4)(c)(ii), during post-closure monitoring, if the liquid level in the LDS sump stays below the pump operating level for two consecutive months, monitoring of the amount of liquid in the LDS sumps can be reduced to at least quarterly. If the liquid level in the LDS sump stays below the pump operating level for two consecutive quarters, monitoring of the amount of liquid in the LDS sumps can be reduced to at least semiannually. Pump operating level is defined as a liquid level approved by Ecology, based on pump activation level, sump dimensions, and level that minimizes head in the sump.

7.3.2 Response Actions

WAC 173-303-665(9) lists several required actions if the ALR is exceeded. In the event that the ALR is exceeded, DOE will:

- Notify Ecology in writing of the exceedance within 7 days of the determination.
- Submit a preliminary written assessment to Ecology within 14 days of the determination, as to the amount of liquids, likely sources of liquids, possible location, size, cause of any leaks, and short-term actions taken and planned.
- Determine, to the extent practicable, the location, size , and cause of any leak.

- Determine whether waste receipt should cease or be curtailed, whether any waste should be removed from the unit for inspection, repairs, or controls, and whether or not the unit should be closed.
- Determine any other short-term and longer-term actions to be taken to mitigate or stop any leaks.

Within 30 days after the notification that the ALR has been exceeded, submit to Ecology the results of the analyses specified in bullets 3, 4, and 5 of this section, the results of actions taken, and actions planned. Monthly thereafter, as long as the flow rate in the LDS exceeds the ALR, the owner or operator must submit to the regional administrator a report summarizing the results of any remedial actions taken and actions planned.

If the ALR is exceeded, the DOE will submit the required notifications to Ecology, as stated above. The EPA will also receive copies of this confirmation.

The leachate will be analyzed for chemical compounds and radionuclides. If the analytical results indicate that these constituents are present, and if the constituents can be traced to a particular type of waste stored in a known area of the landfill, then it may be possible to estimate the location of the leak. However, because the waste will meet land disposal restrictions, it will contain no free liquids and will be stabilized or solidified. In addition, the canister(s) or other type of waste package(s) may not undergo enough deterioration during the active life of the landfill to permit escape of its contents. For these reasons, it is possible that the leachate may be clean or the composition too general to indicate a specific source location.

If the source location cannot be identified, large-scale removal of the waste and operations layer to find and repair the leaking area of the liner would be one option for remediation. However, this procedure risks damaging the liner. In addition, waste would have to be handled, stored, and replaced in the landfill. Backfill would need to be removed from around the waste packages to accomplish this. If the waste packages are damaged during this process, the risk of accidental release may be high. For these reasons, large scale removal of waste and liner system materials is not considered a desirable option and will not be implemented except as a last resort.

The preferred options for remediation include covers and changes in landfill operating procedures. The preferred alternative will depend on factors such as the amount of waste already in the landfill, the rate of waste receipt, the chemistry of the leachate, the availability of other RCRA-compliant disposal facilities, and similar considerations. Hence, at this time no single approach can be selected. If the ALR is exceeded, potential options will be evaluated prior to selecting a remediation process. If necessary, an interim solution will be implemented while the evaluation and permanent remediation is performed. Examples of potential approaches include the following:

- The surface of the intermediate soil cover over the waste could be graded to direct runoff into a shallow pond. The surface would then be covered with a discardable, temporary geomembrane (e.g., 30-mil PVC or reinforced polypropylene). Precipitation water would be pumped or evaporated from the pond and would not infiltrate the waste already in the landfill. Waste packages would be placed only during periods of dry weather and stored temporarily at other times. This type of approach would also be used, if necessary, to reduce leakage during the time immediately after the ALR was exceeded, while other remediation options were being evaluated.
- If the landfill was nearly full, partial construction of the final closure cover might be an option. This would reduce infiltration into the landfill and possibly the leakage rate, if the cover were constructed over the failed area.
- A layer of low-permeability soil could be placed over the existing waste, perhaps in conjunction with a geomembrane, to create a second "primary" liner higher in the landfill. This new liner would intercept precipitation and allow its removal.

- A rigid-frame or air-supported structure could be constructed over the landfill to ensure that no infiltration occurred. Although costly, this approach might be less expensive than constructing a new landfill.

In general, the selected remediation efforts would be those that are easiest to implement, with more difficult or expensive options to be applied only if earlier approaches were not satisfactory.

8.0 REFERENCES

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Liquid Effluent Retention Facility (LERF) & 200 Area Effluent Treatment Facility (ETF)

Change Control Log

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated and transparent manner. Each unit addendum will have a "**Last Modification Date**" which represents the last date the portion of the unit has been modified. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Last modification to Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility **August 25, 2016**

Addenda	Last Modification Date	Modification Number
Conditions	08/25/2016	8c.2016.Q2
A. Part A Form	08/25/2016	8c.2016.Q2
B. Waste Analysis Plan	08/25/2015	8c.2016.Q2
C. Process Information	08/25/2016	8c.2016.Q2
D. Groundwater Monitoring Plan	04/29/2014	
E. Security	06/30/2011	
F. Preparedness and Prevention	08/25/2016	8c.2016.Q2
G. Personnel Training	06/30/2015	
H. Closure Plan	08/25/2016	8c.2016.Q2
I. Inspection	08/25/2016	8c.2016.Q2
J. Contingency Plan	08/25/2016	8c.2016.Q2

PART III, OPERATING UNIT GROUP 3 PERMIT CONDITIONS
LIQUID EFFLUENT RETENTION FACILITY & 200 AREA EFFLUENT TREATMENT FACILITY

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PART III, OPERATING UNIT GROUP 3 PERMIT CONDITIONS
LIQUID EFFLUENT RETENTION FACILITY & 200 AREA EFFLUENT TREATMENT FACILITY

UNIT DESCRIPTION

The Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (200 Area ETF) consists of an aqueous waste treatment system that provides treatment, storage integral to the treatment process, and storage of secondary wastes from the treatment process for a variety of aqueous mixed waste. The 200 Area ETF is located in the 200 East Area. Aqueous wastes managed by the 200 Area ETF include process condensate from the LERF and 200 Area ETF and other aqueous waste generated from onsite remediation and waste management activities.

The LERF consists of three lined surface impoundments, or basins. Aqueous waste from LERF is pumped to the 200 Area ETF for treatment in a series of process units, or systems, that remove or destroy essentially all of the dangerous waste constituents. The treated effluent is discharged to a State-Approved Land Disposal Site (SALDS) north of the 200 West Area, under the authority of a Washington State Waste Discharge Permit Number ST0004500 (Ecology 2014) and 200 Area ETF Delisting (40 Code of Federal Regulations (CFR) 261, Appendix IX, Table 2). Construction of the LERF began in 1990. Waste management operations began at LERF in April 1994. Construction of the 200 Area ETF began in 1992. Waste management operations began at 200 Area ETF in November of 1995.

This Chapter provides unit-specific Permit conditions applicable to the dangerous waste management units for LERF and 200 Area ETF.

LIST OF ADDENDA SPECIFIC TO OPERATING UNIT GROUP 3

Addendum A	Part A Form, dated June 30, 2016
Addendum B	Waste Analysis Plan, dated June 30, 2016
Addendum C	Process Information, dated June 30, 2016
Addendum D	Groundwater Monitoring, approved April 29, 2014
Addendum E	Security Requirements, dated June 30, 2011
Addendum F	Preparedness and Prevention, dated June 30, 2016
Addendum G	Personnel Training, dated June 30, 2015
Addendum H	Closure Plan, dated June 30, 2016
Addendum I	Inspection Requirements, dated June 30, 2016
Addendum J	Contingency Plan, dated June 30, 2016

DEFINITIONS

State and federal delisting actions: The state delisting action pursuant to Washington Administrative Code (WAC) 173-303-910(3), August 8, 2005, and the federal delisting action appearing in 40 CFR 261, Appendix IX, Table 2 applicable to the United States, Department of Energy, Richland, Washington.

ACRONYMS

LERF and 200 Area ETF	200-Area Liquids Processing Facility

III.3.A COMPLIANCE WITH UNIT-SPECIFIC PERMIT CONDITIONS

III.3.A.1 The Permittees will comply with all Permit Conditions in this Chapter and its Addendums with respect to dangerous waste management and dangerous waste management units in LERF and 200 Area ETF, in addition to requirements in Permit Part I and Part II.

III.3.B GENERAL WASTE MANAGEMENT

III.3.B.1 The Permittees are authorized to accept dangerous and/or mixed waste for treatment in dangerous waste management units that satisfies the waste acceptance criteria in Permit Addendum B according to the waste acceptance procedures in Permit Addendum B. [WAC 173-303-300]

III.3.B.2 The Permittees are authorized to manage dangerous and/or mixed wastes physically present in the dangerous waste management units in LERF and 200 Area ETF as of the effective date of this Permit according to the requirements of Permit Condition III.3.B.1.

III.3.B.3 The Permittees are authorized to treat and/or store dangerous/mixed waste in the dangerous waste management units in LERF and 200 Area ETF according to the following requirements:

III.3.B.3.a The Permittees are authorized to treat, and store as necessary in support of treatment, dangerous waste in the 200 Area ETF tank systems identified in Permit Addendum C, Section C.2, and Section C.4 according to the Permit Conditions of this Chapter.

III.3.B.3.b The Permittees are authorized to store and treat those dangerous and/or mixed waste identified in Permit Addendum C, Section C.3, in containers according to the requirements of this Chapter. All container management activities pursuant to this Permit Condition will take place within the container storage areas or within the 200 Area ETF process area identified in Permit Addendum C, Figures C.2 and C.3.

III.3.B.3.c Treatment in containers authorized by Permit Condition III.3.B.3.b is limited to decanting of free liquids, and addition of sorbents to free liquids. The Permittees will ensure that sorbents are compatible with wastes and the containers. Sorbents will be compliant with the requirements of WAC 173-303-140(4)(b)(iv), incorporated by reference.

III.3.B.3.d The Permittees are authorized to treat aqueous waste in LERF Basins (Basins 42, 43 and 44) subject to the following requirements:

III.3.B.3.d.1 Following treatment in a LERF basin, aqueous wastes must be treated in 200 Area ETF according to Permit Conditions III.3.B.3.a through c.; [40 CFR 268.4(2)(iii), incorporated by reference by WAC 173-303-140]

III.3.B.3.d.2 The Permittees must ensure that for each basin, either supernatant is removed on a flow-through basis, to meet the requirement of 40 CFR 268.4(a)(2)(ii) incorporated by reference by WAC 173-303-140, or incoming waste is shown to not contain solids by either: (1) sampling results showing the waste does not contain detectable solids, or (2) filtering through a 10 micron filter;[WAC 173-303-815(2)(b)(ii)]

III.3.B.4 The Permittees will maintain the physical structure of the LERF and 200 Area ETF as documented in the applicable sections of Permit Addendum C, Section C.2. [WAC 173-303-630(7), WAC 173-303-640(3), WAC 173-303-640(4)]

III.3.B.5 The Permittees are authorized to use treated effluent for recycle/makeup water purposes at the 200 Area ETF as outlined in Permit Addendum C, Section C.2.5.5, and the letters dated August 19, 2005, EPA Region 10 to Keith A. Klein; and August 8, 2005, Department of Ecology to Keith A. Klein. [WAC 173-303-815 (2)(b)(ii)]

III.3.B.6 The Permittees will maintain and operate systems for the 200 Area ETF documented in Permit Addendum C, Section C.2.5 as necessary for proper operation of the 200 Area ETF, compliance with the conditions of this Permit, and protection of human health and the environment. For purposes of this Permit Condition, the Monitor and Control System documented in Permit Addendum C, Section C.2.5.1, is considered to include all indicators, sensors, transducers, actuators and other control devices connected to but remote from the centralized monitor and control system (MCS) computer.

III.3.B.7 The Permittees must complete the following requirements prior to acceptance for treatment in 200 Area ETF aqueous waste streams with listed waste numbers subject to the requirements of the State and Federal delisting: [WAC 173-303-815(2)(b)(ii)]

III.3.B.7.a The Permittees will prepare a written waste processing strategy according to the requirements of the State and Federal Delisting Actions Conditions (1)(a)(ii) and (1)(b), incorporated by reference, and Permit Addendum B, Section B.2.2.2.

III.3.B.7.b The waste processing strategy required by Permit Condition III.3.B.7.a, must document the proposed processing configuration for the 200 Area ETF, operating conditions for each processing unit, and the expected treated effluent characteristics based on the process model and treatability envelope data required by State and Federal Delisting Conditions (1)(a)(ii) and (1)(b).

III.3.B.7.c The written waste processing strategy required by Permit Condition III.3.B.7.a must demonstrate that the projected treated effluent characteristics satisfy the delisting exclusion limits in State and Federal Delisting Condition (5) of the state and federal delisting actions, and the discharge limits of the Discharge Permit Number ST0004500 (Ecology 2014).

III.3.B.7.d The Permittees will place a copy of the written waste processing strategy required by Permit Condition III.3.B.7.a in the Hanford Facility Operating Record, LERF and 200 Area ETF file as part of the documentation of waste streams accepted for management at the 200 Area ETF.

III.3.B.8 Treatment of aqueous waste streams in the 200 Area ETF with listed waste numbers that are subject to the requirements of the state and federal delisting actions must comply with the requirements of State and Federal Delisting Condition (1)(c), incorporated by reference. [WAC 173-303-815 (2)(b)(ii)]

III.3.B.9 The Permittees will manage treated effluent in the final verification tanks according to the requirements of the State and Federal Delisting Conditions (3) and (5), incorporated by reference. [WAC 173-303-815 (2)(b)(ii)]

III.3.B.10 The Permittees will manage treated effluent from the 200 Area ETF according to the requirements of the Discharge Permit Number ST0004500 (Ecology 2014) and State and Federal Delisting Condition (7). [WAC 173-303-815(2)(b)(ii)]

III.3.B.11 The Permittees will ensure compliance with treatment standards (40 CFR 268, incorporated by reference by WAC 173-303-140) applicable to treated effluent prior to discharge to the State Authorized Land Disposal Site (SALDS), the delisting criteria at 40 CFR 261, Appendix IX, Table 2, and the corresponding state-approved delisting (dated August 8, 2005, all incorporated by reference). Sampling and analysis necessary for these demonstrations must meet the corresponding requirements in Permit Addendum B. [WAC 173-303-140, WAC 173-303-815 (2)(b)(ii)]

III.3.C WASTE ANALYSIS

III.3.C.1 The Permittees will comply with requirements in Permit Addendum B for sampling and analysis of all dangerous and/or mixed waste required by conditions in this Chapter. [WAC 173-303-300]

III.3.C.2 The Permittees will have an accurate and complete waste profile as described in Permit Addendum B, Section B.2.1.2, for every waste stream accepted for management in LERF and 200 Area ETF dangerous waste management units. [WAC 173-303-380 (1)(a), (b)]

III.3.C.3 The Permittees will place a copy of each waste profile required by Permit Condition III.3.C.2 in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.1.j. [WAC 173-303-380 (1)(a), (b)]

III.3.C.4 The Permittees will make a copy of the waste profile required by Permit Condition III.3.C.2 available upon request. [WAC 173-303-380 (1)(a), (b)]

III.3.C.5 Records and results of waste analysis described in this Permit will be maintained in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.1.b. [WAC 173-303-380 (1)(a), (b)]

III.3.D RECORDKEEPING AND REPORTING

III.3.D.1 The Permittees will place the following into the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.1:

III.3.D.1.a Records required by WAC 173-303-380 (1)(k), and -(o) incorporated by reference.

III.3.D.1.b Records and results of waste analysis, waste determinations (as required by Subpart CC) and trial tests required by WAC 173-303-300, General waste analysis, and by 40 CFR §264.1034,§264.1063, §264.1083, §265.1034, §265.1063, §265.1084, §268.4(a), and §268.7; [WAC 173-303-310(2)]

III.3.D.1.c An inspection log, summarizing inspections conducted pursuant to Permit Condition III.3.H.1; [WAC 173-303-380(1)(e)]

III.3.D.1.d Records required by the State and Federal Delisting Condition (6), incorporated by reference; [WAC 173-303-815 (2)(b)(ii)]

III.3.E SECURITY

III.3.E.1 The Permittees comply with the Security requirements specific to the LERF and 200 Area ETF in Addendum E and Permit Attachment 3 as required by Permit Condition II.M. [WAC 173-303-310(2)]

III.3.F PREPAREDNESS AND PREVENTION

III.3.F.1 The Permittees will comply with the Preparedness and Prevention requirements specific to LERF and 200 Area ETF in Addendum F. [WAC 173-303-340]

III.3.G CONTINGENCY PLAN

III.3.G.1 The Permittees will comply with Addendum J, Contingency Plan, in addition to the requirements of Permit Condition II.A when applicable. [WAC 173-303-350]

III.3.H INSPECTIONS

III.3.H.1 The Permittees will comply with Addendum I in addition to the requirements of Permit Condition II.X. [WAC 173-303-320]

III.3.I **TRAINING PLAN**

III.3.I.1 The Permittees will include the training requirements described in Addendum G of this Chapter specific to the dangerous waste management units and waste management activities at LERF and 200 Area ETF into the written training plan required by Permit Condition II.C.

III.3.J **GENERAL REQUIREMENTS**

III.3.J.1 The Permittees will comply with the requirements of WAC 173-303-395(1), incorporated by reference, for prevention of reaction of ignitable, reactive, or incompatible wastes.

III.3.K **CLOSURE**

III.3.K.1 The Permittees will close dangerous waste management units in the LERF and 200 Area ETF in accordance with Addendum H, Closure Plan, and Permit Condition II.J. [WAC 173-303-610(3)(a)]

III.3.L **POST CLOSURE – RESERVED**

III.3.M **CRITICAL SYSTEMS – RESERVED**

III.3.N **RESERVED**

III.3.O **CONTAINERS**

III.3.O.1 Container Storage and Treatment Unit Standards

III.3.O.1.a As part of or in addition to the requirements of Permit Condition III.3.B.2, the Permittees will ensure the integrity of container storage secondary containment and the chemically resistant coating described in Addendum C, Section C.3.4.1 as necessary to ensure any spills or releases to secondary containment do not migrate to the underlying concrete or soils.

III.3.O.1.a.1 Include documentation of any damage and subsequent repairs in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.I.

III.3.O.2 Container Management Standards

III.3.O.2.a The Permittees will maintain and manage wastes in accordance with the requirements of Addendum C, Section C.3.2. [WAC 173-303-630(2)]

III.3.O.2.b The Permittees will label containers in accordance with the requirements of Addendum C, Section C.3.2, and Section C.3.3. [WAC 173-303-630(3)]

III.3.O.2.c The Permittees will comply with the requirements for managing wastes in containers in WAC 173-303-630(5), incorporated by reference.

III.3.O.2.d The Permittees will ensure wastes are compatible with containers and with other wastes stored or treated in containers within the 200 Area ETF according to the requirements of Addendum C, Section C.3.1 and C.3.4.6. [WAC 173-303-630(4), WAC 173-303-630(9)]

III.3.O.2.e The Permittees may treat wastes in containers via decanting of free liquids and addition of sorbents. The Permittees may not use addition of sorbents for purposes of changing the treatability group of a waste with respect to the land disposal restriction standards of 40 CFR 268, incorporated by reference by WAC 173-303-140.

III.3.O.2.f The Permittees will remove any accumulated liquids from container storage areas in 200 Area ETF according to the requirements of Addendum C, Section C.3.4.5, to ensure containers are not in contact with free liquids and to prevent overflow of the container storage area secondary containment.

III.3.O.2.g The Permittees will comply with the requirements for air emissions from containers in Addendum C, Section C.6.3.2. [WAC 173-303-692]

III.3.P TANK SYSTEMS

III.3.P.1 Tank System Requirements

III.3.P.1.a The Permittees will develop a schedule for conducting integrity assessments (IA). The schedule will meet the requirements of Addendum C, Section C.4.1.5, and consideration of the factors in WAC 173-303-640(2)(e) or WAC 173-303-640(3)(b) as applicable:

III.3.P.1.b The Permittees will maintain a copy of the schedule required by Permit Condition III.3.P.1.a, in the Hanford Facility Operating Record, LERF and 200 Area ETF file, and conduct periodic integrity assessments according to the schedule. The Permittees will document results of integrity assessments conducted according to the IA in the Hanford Facility Operating Record, LERF and 200 Area ETF file.

III.3.P.1.c For existing tank systems, if a tank system is found to be leaking, or is unfit for use, the Permittees must follow the requirements of WAC 173-303-640(7), incorporated by reference. [WAC 173-303-640(3)(b)]

III.3.P.2 Tank System Operating Requirements

III.3.P.2.a The Permittees will comply with the requirements of WAC 173-303-640(5)(a), incorporated by reference.

III.3.P.2.b The Permittees will comply with the requirements of Addendum C, Section C.4.4.2. [WAC 173-303-640(5)(b)]

III.3.P.2.c The Permittees will comply with the requirements of Addendum C, Section C.4.5. [WAC 173-303-640(5)(d)]

III.3.P.2.d The Permittees will comply with the requirements of WAC 173-303-640(7), incorporated by reference, in response to spills or leaks from tanks systems at 200 Area ETF. [WAC 173-303-640(5)(c)]

III.3.P.2.e The Permittees will ensure that the Waste Processing Strategy required by Permit Condition III.3.B.7.a, provides for the immediate treatment or blending of waste accepted for management at the 200 Area ETF such that the resulting waste or mixture is no longer reactive or ignitable when further managed in 200 Area ETF tank systems. [WAC 173-303-640(9)]

III.3.P.2.f The Permittees will comply with the requirements of WAC 173-303-640(10), incorporated by reference.

III.3.Q SURFACE IMPOUNDMENTS

III.3.Q.1 The Permittees will maintain the three LERF basins according to the requirements of WAC 173-303-650 (2)(f), incorporated by reference.

III.3.Q.2 The Permittees will operate the LERF basins according to the requirements of Addendum C, Section C.5.3, and Addendum I, Section I.1.2.3.1 to prevent over-topping. [WAC 173-303-650 (2)(c)]

III.3.Q.3 The Permittees will develop and maintain, and operate the LERF basins to ensure that any flow of waste into the impoundment can be immediately shut off in the event of overtopping or liner failure. [WAC 173-303-650 (2)(d)]

III.3.Q.4 The Permittees will comply with the requirements of WAC 173-303-650 (2)(g), incorporated by reference.

III.3.Q.5 The Permittees will comply with the requirements of WAC 173-303-650 (4)(b), incorporated by reference.

III.3.Q.6 The Permittees will comply with the requirements of WAC 173-303-650 (4)(c), incorporated by reference. The certification required by this Permit Condition must be provided to Ecology no later than seven calendar days after the date of the certification. A copy of the certification will be placed in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.1. [WAC 173-303-650 (4)(c)]

III.3.Q.7 The Permittees will comply with the requirements of WAC 173-303-650(5)(b), incorporated by reference, in response to events in WAC 173-303-650(5)(a), incorporated by reference.

III.3.Q.8 The Permittees will comply with the requirements of WAC 173-303-650(5)(d) for any LERF basin that has been removed from service in accordance with Permit Condition III.3.Q.7 that the Permittees will restore to service. [WAC 173-303-650(5)(d)]

III.3.Q.9 The Permittees will close any LERF basin removed from service in accordance with the requirements of Permit Condition III.3.Q.7 or a basin that cannot be repaired or that the Permittees will not to return to service. [WAC 173-303-650(5)(e)]

III.3.Q.10 The Permittees will comply with the requirements of Addendum C, Section C.5.10 with respect to management of ignitable or reactive wastes in the LERF basins. [WAC 173-303-650(7)]

III.3.Q.11 The Permittees can place incompatible wastes and materials in the same LERF basin only if in compliance with the requirements of WAC 173-303-395(1)(b), (c). [WAC 173-303-650(8)]

III.3.Q.12 The Permittees will use the action leakage rate in Addendum C, Section C.5.8, for operation of LERF basins, and comply with the requirements of WAC 173-303-650(10)(b). [WAC 173-303-650(10)]

III.3.Q.13 The Permittees will comply with the requirements of WAC 173-303-650(11), incorporated by reference.

III.3.Q.14 The Permittees will comply with the requirements of 40 CFR 264, Subpart CC, incorporated by reference by WAC 173-303-692.

III.3.R GROUNDWATER

III.3.R.1 The Permittees will comply with the requirements of Addendum D, Groundwater Monitoring Plan. [WAC 173-303-645]

III.3.R.2 All wells constructed pursuant to this Permit will be constructed in compliance with Chapter 173-160 WAC incorporated by reference through WAC 173-303-645 (8)(c).

III.3.R.3 Update the Groundwater Monitoring Network

III.3.R.3.a The Permittees will install an additional downgradient monitoring well E-26-15 as identified in Addendum D, Groundwater Monitoring Plan by December, 2016.

III.3.R.3.b Within 60-days of the well installation, the Permittees will submit a Class 2 Permit modification [WAC 173-303-830 Appendix I, C.1.a] to update Addendum D and include the additional monitoring well into the groundwater monitoring network.

III.3.R.3.c Concurrently with the permit modification request, the Permittees will submit a revised "Liquid Effluent Retention Facility Characterization Report" for the additional monitoring well that includes:

1) Well construction in accordance with WAC 173-303-645(8)(c)
2) Well screen placement in the upper aquifer in accordance with WAC 173-303-645(8)(a)
3) Hydrogeologic conditions, stratigraphy and hydraulic conductivity, derived from geologist observations of borehole archive samples, down hole gamma logging, and aquifer slug tests in accordance with WAC 173-303-645(8)(a)(i)(A)
4) Drilling and sampling details in accordance with WAC 173-303-645(8)(d)
5) Borehole corrections (e.g., precision surveys, gyroscopic corrections, and barometric response corrections) to ensure adequate hydraulic understanding considering the very small gradient in accordance with WAC 173-303-645(8)(f)
6) Geochemical comparison of the water quality with other existing wells to ensure anticipated representative conditions in accordance with WAC 173-303-645(8)(a)(ii)
7) Document surface location as required by WAC 173-303-645(6)

III.3.R.3.c.1 Groundwater sample results from the new well (E-26-15) and the existing wells for all constituents in the Addendum D, Groundwater Monitoring Plan for the Liquid Effluent Retention Facility,

III.3.R.3.c.2 Results of evaluating final well development data and drilling logs,

III.3.R.3.c.2.a A well use designation (e.g., upgradient or downgradient).

ADDENDUM A
LIQUID EFFLUENT RETENTION FACILITY & 200 AREA EFFLUENT TREATMENT FACILITY
PART A FORM

1

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Addendum A

Part A Form

Date Received	Reviewed by: EK Shnmidt	Date:	0	3	3	1	2	0	1	5
Month Day Year	Approved by: EK Shnmidt for Suzanne Dahl	Date:	0	3	3	1	2	0	1	5

I. This form is submitted to: (place an "X" in the appropriate box)

☒	Request modification to a final status permit (commonly called a "Part B" permit)	
☐	Request a change under interim status	
☐	Apply for a final status permit. This includes the application for the initial final status permit for a site or for a permit renewal (i.e., a new permit to replace an expiring permit).	
☐	Establish interim status because of the wastes newly regulated on:	(Date)
	List waste codes:	

II. EPA/State ID Number

W	A	7	8	9	0	0	0	8	9	6	7

III. Name of Facility

U.S. Department of Energy – Hanford Facility

IV. Facility Location (Physical address not P.O. Box or Route Number)

A. Street

Refer to Permit Attachment 2, Hanford Facility Permit Legal Description

City or Town	State	ZIP Code
Near Richland	WA	

County Code			County Name
0	0	5	Benton

B. Land Type	C. Geographic Location Latitude (degrees, mins, secs)	Longitude (degrees, mins, secs)	D. Facility Existence Date Month	Day	Year
F	Refer to TOPO Map (Section XV.)		11	19	1980

V. Facility Mailing Address

Street or P.O. Box

P.O. Box 450

City or Town	State	ZIP Code
Richland	WA	99352

VI. Facility contact (Person to be contacted regarding waste activities at facility)		
Name (last)	**(first)**	
Smith	Kevin	
Job Title	**Phone Number (area code and number)**	
Manager	(509) 372-2315	
Contact Address		
Street or P.O. Box		
P.O. Box 450		
City or Town	**State**	**ZIP Code**
Richland	WA	99352

VII. Facility Operator Information		
A. Name		**Phone Number**
Department of Energy Owner/Operator Washington River Protection Solutions, LLC Co-Operator for dangerous waste management units in LERF & 200 Area ETF*		(509) 372-2315 (509) 372-9974*
Street or P.O. Box		
P.O. Box 450 P.O. Box 850*		
City or Town	**State**	**ZIP Code**
Richland	WA	99352
B. Operator Type	F	
C. Does the name in VII.A reflect a proposed change in operator?	☐ Yes ☒ No	
If yes, provide the scheduled date for the change:	Month / Day / Year	
D. Is the name listed in VII.A. also the owner? If yes, skip to Section VIII.C.	☐ Yes ☒ No	

VIII. Facility Owner Information		
A. Name	**Phone Number (area code and number)**	
U.S. Department of Energy	(509) 372-2315	
Street or P.O. Box		
P.O. Box 450		
City or Town	**State**	**ZIP Code**
Richland	WA	99352
B. Owner Type	F	
C. Does the name in VIII.A reflect a proposed change in owner?	☐ Yes ☒ No	
If yes, provide the scheduled date for the change:	Month / Day / Year	

IX. NAICS Codes (5/6 digit codes)													
A. First							**B. Second**						
5	6	2	2	1	1	Waste Treatment & Disposal							
C. Third							**D. Fourth**						

1

X. Other Environmental Permits (see instructions)

A. Permit Type	B. Permit Number	C. Description
E	AOP00-05-006	Title V Air Operating Permit
E	DELISTING	ETF Delisting, 70 Federal Register (FR) 44496, dated August 3, 2005
E	TSCA	Toxic Substance Control Act Risk-based Disposal approval Application for Management of Polychlorinated Biphenyl Remediation Waste at the 200 Area Liquid Waste Processing Facilities, dated June 8, 2004
E	OAWT-107	Approval of the Request for Approval of Alternate Reuse Practices for the 200 Area Effluent Treatment Facility (ETF) Treated Effluent, 05-AMCP-0378, dated August 3, 2005
E	ST0004500	WAC 173-216, State Waste Discharge Permit for the 200 Area Effluent Treatment Facility State-Approved Land Disposal Site
E	ST0004511	WAC 173-216, State Waste Discharge Permit Program, Sitewide Permit for Miscellaneous Streams

XI. Nature of Business (provide a brief description that includes both dangerous waste and non-dangerous waste areas and activities)

Construction of the Liquid Effluent Retention Facility (LERF) began in 1990. Waste management operations began at LERF in April 1994. Construction of the 200 Area ETF began in 1992. Waste management operations began at the 200 Area ETF in November of 1995.

The LERF and 200 Area ETF comprise an aqueous waste treatment system located in the 200 East Area that provides storage and treatment for a variety of aqueous mixed waste. This aqueous waste includes process condensate from the 242-A Evaporator and other aqueous waste generated from onsite remediation and waste management activities.

The LERF consists of three lined surface impoundments, or basins. Aqueous waste from LERF is pumped to the 200 Area ETF for treatment in a series of process units, or systems, that remove or destroy dangerous waste constituents. The treated effluent is discharged to a State-Approved Land Disposal Site north of the 200 West Area, under the authority of a Washington State Waste Discharge Permit (ST0004500) and the 200 Area Final Delisting (40 CFR 261, Appendix IX, Table 2)

Sludge that accumulates in the bottoms of 200 Area ETF process tanks is removed periodically and placed into containers. The waste is solidified by decanting the supernate from the container and the remainder of the liquid is allowed to evaporate, or absorbents are added, as necessary, to address the residual liquid. The process design capacity for treatment of waste in containers (T04) is listed in Section XII.

1

EXAMPLE FOR COMPLETING ITEMS XII and XIII (shown in lines numbered X-1, X-2, and X-3 below): A facility has two storage tanks that hold 1200 gallons and 400 gallons respectively. There is also treatment in tanks at 20 gallons/hr. Finally, a one-quarter acre area that is two meters deep will undergo in situ *vitrification*.

Section XII. Process Codes and Design Capacities

Line Number		A. Process Codes (enter code)			B. Process Design Capacity 1. Amount	B. Process Design Capacity 2. Unit of Measure (enter code)	C. Process Total Number of Units
X	1	S	0	2	1,600	G	002
X	2	T	0	3	20	E	001
X	3	T	0	4	700	C	001
	1	S	0	4	88,500,000	L	003
	2	T	0	2	88,500,000	V	003
	3	S	0	2	9,849,350	L	019
	4	T	0	1	817,646	V	019
	5	S	0	1	147,630	L	003
	6	T	0	4	18,927	V	001
	7						
	8						
	9						
1	0						
1	1						
1	2						
1	3						
1	4						
1	5						
1	6						
1	7						
1	8						
1	9						
2	0						
2	1						
2	2						
2	3						
2	4						
2	5						

Section XIII. Other Process Codes

Line Number		A. Process Codes (enter code)			B. Process Design Capacity 1. Amount	B. Process Design Capacity 2. Unit of Measure (enter code)	C. Process Total Number of Units	D. Process Description
X	1	T	0	4	700	C	001	In situ vitrification
	1	T	0	4	18,927	V	001	container treatment
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
1	0							
1	1							
1	2							
1	3							
1	4							
1	5							
1	6							
1	7							
1	8							
1	9							
2	0							
2	1							
2	2							
2	3							
2	4							
2	5							

XIV. Description of Dangerous Wastes

Example for completing this section: A facility will receive three non-listed wastes, then store and treat them on-site. Two wastes are corrosive only, with the facility receiving and storing the wastes in containers. There will be about 200 pounds per year of each of these two wastes, which will be neutralized in a tank. The other waste is corrosive and ignitable and will be neutralized then blended into hazardous waste fuel. There will be about 100 pounds per year of that waste, which will be received in bulk and put into tanks.

Line Number		A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Processes (1) Process Codes (enter)									D. Processes (2) Process Description [If a code is not entered in D (1)]
X	1	D	0	0	2	400	P	S	0	1	T	0	1				
X	2	D	0	0	1	100	P	S	0	2	T	0	1				
X	3	D	0	0	2												Included with above
	1	D	0	0	1	106,940,410	K	S	0	4	T	0	2	0	0	0	
	2	D	0	0	2		K	S	0	2	T	0	1	0	0	0	Included with above
	3	D	0	0	3												Included with above
	4	D	0	0	4												Included with above
	5	D	0	0	5												Included with above
	6	D	0	0	6												Included with above
	7	D	0	0	7												Included with above
	8	D	0	0	8												Included with above
	9	D	0	0	9												Included with above
	10	D	0	1	0												Included with above
	11	D	0	1	1												Included with above
	12	D	0	1	8												Included with above
	13	D	0	1	9												Included with above
	14	D	0	2	2												Included with above
	15	D	0	2	8												Included with above
	16	D	0	2	9												Included with above
	17	D	0	3	0												Included with above
	18	D	0	3	3												Included with above
	19	D	0	3	4												Included with above
	20	D	0	3	5												Included with above
	21	D	0	3	6												Included with above
	22	D	0	3	8												Included with above
	23	D	0	3	9												Included with above
	24	D	0	4	0												Included with above
	25	D	0	4	1												Included with above

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process									
							(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
26	D	0	4	3												Included with above
27	F	0	0	1												Included with above
28	F	0	0	2												Included with above
29	F	0	0	3												Included with above
30	F	0	0	4												Included with above
31	F	0	0	5												Included with above
32	F	0	3	9												Included with above
33	W	T	0	1												Included with above
34	W	T	0	2												Included with above
35	U	2	1	0												Included with above
36	D	0	0	1	153,932	K	S	0	1							Includes Debris
37	D	0	0	2												Included with above
38	D	0	0	3												Included with above
39	D	0	0	4												Included with above
40	D	0	0	5												Included with above
41	D	0	0	6												Included with above
42	D	0	0	7												Included with above
43	D	0	0	8												Included with above
44	D	0	0	9												Included with above
45	D	0	1	0												Included with above
46	D	0	1	1												Included with above
47	D	0	1	8												Included with above
48	D	0	1	9												Included with above
49	D	0	2	2												Included with above
50	D	0	2	8												Included with above
51	D	0	2	9												Included with above
52	D	0	3	0												Included with above
53	D	0	3	3												Included with above
54	D	0	3	4												Included with above
55	D	0	3	5												Included with above
56	D	0	3	6												Included with above

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process									
							(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
57	D	0	3	8												Included with above
58	D	0	3	9												Included with above
59	D	0	4	0												Included with above
60	D	0	4	1												Included with above
61	D	0	4	3												Included with above
62	F	0	0	1												Included with above
63	F	0	0	2												Included with above
64	F	0	0	3												Included with above
65	F	0	0	4												Included with above
66	F	0	0	5												Included with above
67	F	0	3	9												Included with above
68	W	T	0	1												Included with above
69	W	T	0	2												Included with above
70	U	2	1	0												Included with above
71	D	0	0	1	81,310	K	T	0	4							Includes Debris
72	D	0	0	2												Included with above
73	D	0	0	3												Included with above
74	D	0	0	4												Included with above
75	D	0	0	5												Included with above
76	D	0	0	6												Included with above
77	D	0	0	7												Included with above
78	D	0	0	8												Included with above
79	D	0	0	9												Included with above
80	D	0	1	0												Included with above
81	D	0	1	1												Included with above
82	D	0	1	8												Included with above
83	D	0	1	9												Included with above
84	D	0	2	2												Included with above
85	D	0	2	8												Included with above
86	D	0	2	9												Included with above

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
							(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
87	D	0	3	0				Included with above
88	D	0	3	3				Included with above
89	D	0	3	4				Included with above
90	D	0	3	5				Included with above
91	D	0	3	6				Included with above
92	D	0	3	8				Included with above
93	D	0	3	9				Included with above
94	D	0	4	0				Included with above
95	D	0	4	1				Included with above
96	D	0	4	3				Included with above
97	F	0	0	1				Included with above
98	F	0	0	2				Included with above
99	F	0	0	3				Included with above
100	F	0	0	4				Included with above
101	F	0	0	5				Included with above
102	F	0	3	9				Included with above
103	W	T	0	1				Included with above
104	W	T	0	2				Included with above
105	U	2	1	0				Included with above
106								
107								
108								
109								
110								
111								

XV. Map

Attach to this application a topographic map of the area extending to at least one (1) mile beyond property boundaries. The map must show the outline of the facility; the location of each of its existing and proposed intake and discharge structures; each of its dangerous waste treatment, storage, recycling, or disposal units; and each well where fluids are injected underground. Include all springs, rivers, and other surface water bodies in this map area, plus drinking water wells listed in public records or otherwise known to the applicant within ¼ mile of the facility property boundary. The instructions provide additional information on meeting these requirements.

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (refer to Instructions for more detail).

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, recycling, and disposal areas; and sites of future storage, treatment, recycling, or disposal areas (refer to Instructions for more detail).

XVIII. Certifications

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Operator Name and Official Title (type or print) Kevin W. Smith, Manager U.S. Department of Energy Office of River Protection	**Signature**	**Date Signed**
Co-Operator* Name and Official Title (type or print) L. David Olson President and Project Manager Washington River Protection Solutions, LLC	**Signature**	**Date Signed**
Co-Operator – Address and Telephone Number* P.O. Box 850 Richland, WA 99352 (509) 372-9974		
Facility-Property Owner Name and Official Title (type or print) Kevin W. Smith, Manager U.S. Department of Energy Office of River Protection	**Signature**	**Date Signed**

1

Comments

1

1 Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility

2

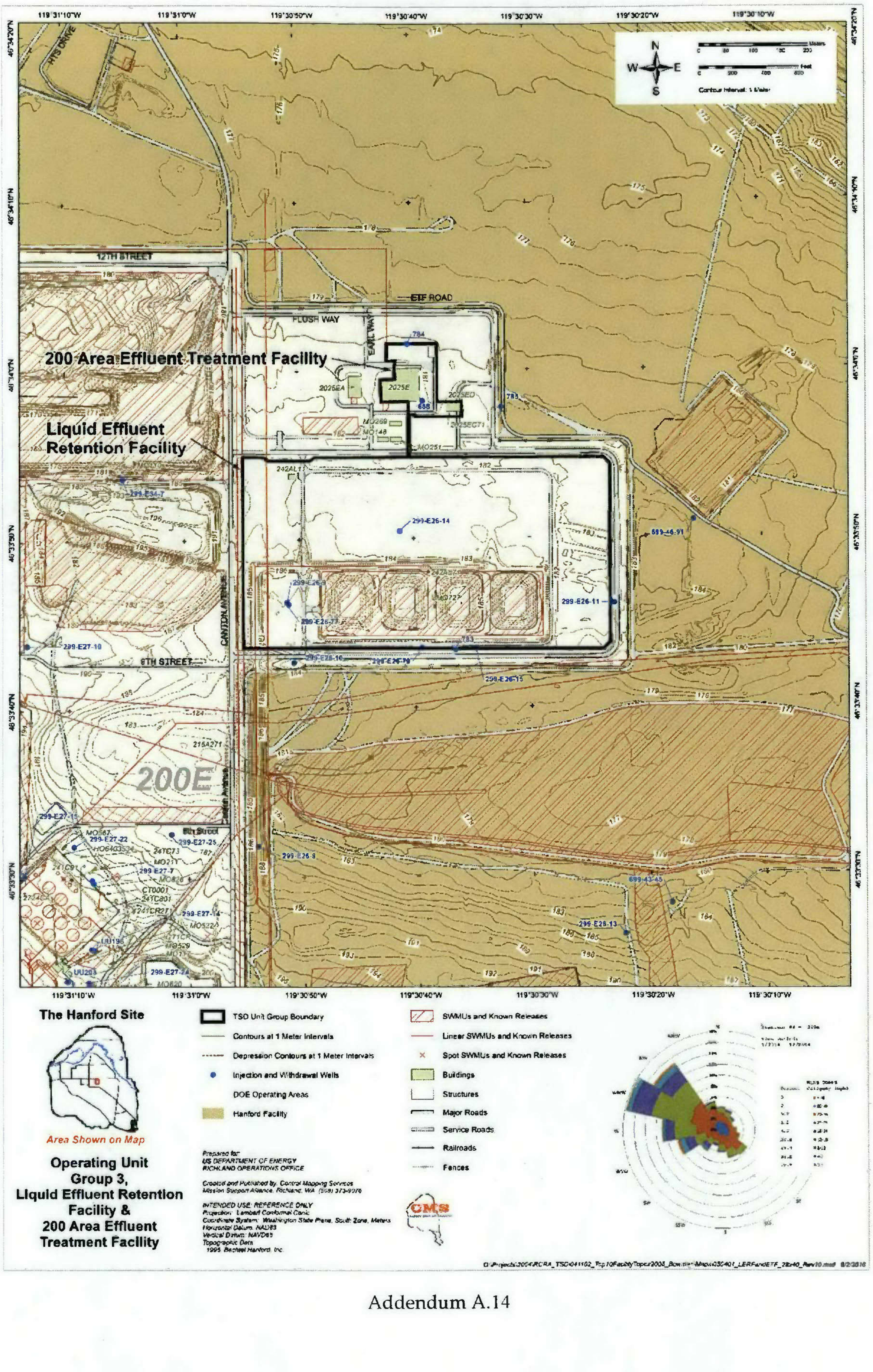
Photo Taken 2/2010

Typical Basin Photo Taken 1992

200 Area Effluent Treatment Facility

Photo Taken 2005

1


200 Area Effluent Treatment Facility
Liquid Effluent Retention Facility
12TH STREET
6TH STREET
ETF ROAD
FLUSH WAY
CANTON AVENUE
200E
The Hanford Site
Area Shown on Map
Operating Unit Group 3, Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility
TSD Unit Group Boundary
Contours at 1 Meter Intervals
Depression Contours at 1 Meter Intervals
Injection and Withdrawal Wells
DOE Operating Areas
Hanford Facility
SWMUs and Known Releases
Linear SWMUs and Known Releases
Spot SWMUs and Known Releases
Buildings
Structures
Major Roads
Service Roads
Railroads
Fences
Prepared for: US DEPARTMENT OF ENERGY RICHLAND OPERATIONS OFFICE
INTENDED USE: REFERENCE ONLY

ADDENDUM B
WASTE ANALYSIS PLAN

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ADDENDUM B
WASTE ANALYSIS PLAN

TABLE OF CONTENTS

TABLES

Metric Conversion Chart

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			Length		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			Area		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			Mass (weight)		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			Volume		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Force			Force		
pounds per square inch	6.895	kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, P.E., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

B. WASTE ANALYSIS PLAN

B.1 Introduction

In accordance with the regulations set forth in the Washington State Department of Ecology (Ecology) *Dangerous Waste Regulations*, Washington Administrative Code (WAC) 173-303-300, this waste analysis plan (WAP) has been prepared for operation of the Liquid Effluent Retention Facility (LERF) and the 200 Area Effluent Treatment Facility (200 Area ETF) located in the 200 East Area on the Hanford Site, Richland, Washington.

The purpose of this WAP is to ensure that adequate knowledge as defined in WAC 173-303-040, is obtained for dangerous and/or mixed waste accepted by and managed in LERF and 200 Area ETF. This WAP documents the sampling and analytical methods, and describes the procedures used to obtain this knowledge. This WAP also documents the requirements for generators sending aqueous waste to the LERF or 200 Area ETF for treatment. Throughout this WAP, the term generator includes any Hanford Site source, including treatment, storage, and disposal (TSD) units, whose process produces an aqueous waste.

LERF consists of three surface impoundments, which provide treatment and storage. The 200 Area ETF includes a tank system, which provides treatment and storage, and a container management area, which provides container storage and treatment. Additionally, this WAP discusses the sampling and analytical methods for the treated effluent (treated aqueous waste) that is discharged from 200 Area ETF as a non-dangerous, delisted waste to the State Approved Land Disposal Site (SALDS). Specifically, the WAP contains sampling and analysis requirements including quality assurance/quality control requirements, for the following:

- **Influent Waste Acceptance Process** - determines the acceptability of a particular aqueous waste at the LERF or 200 Area ETF pursuant to applicable Permit conditions, regulatory requirements, and operating capabilities prior to acceptance of the waste at the LERF or 200 Area ETF for treatment or storage. This includes documenting that wastes accepted for treatment at 200 Area ETF are within the treatability envelope required by the Final Delisting 200 Area ETF, Permit Condition 1.a.i. Refer to Section B.2.
- **Special Management Requirements** - identifies the special management requirements for aqueous wastes managed in the LERF or 200 Area ETF. Refer to Section B.3.
- **Influent Aqueous Waste Sampling and Analysis** - describes influent sampling and analyses used to characterize an influent aqueous waste to ensure proper management of the waste and for compliance with the special management requirements. Also includes rationale for analyses. Refer to Section B.4.
- **Treated Effluent Sampling and Analysis** - describes sampling and analyses of treated effluent (i.e., treated aqueous waste) for compliance with Discharge Permit Number ST0004500; and Final Delisting 200 Area ETF [40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3) and the corresponding State Final Delisting issued pursuant to WAC 173-303-910(3) limits]. Also includes rationale for analyses. Refer to Section B.5.
- **200 Area ETF Generated Waste Sampling and Analysis** - describes the sampling and analyses used to characterize the secondary waste streams generated from the treatment process and to characterize waste generated from maintenance and operations activities. Also includes rationale for analyses. Characterization and designation of wastes generated from maintenance and operations activities are conducted pursuant to WAC 173-303-170 and are not subject to the permit requirements of WAC 173-303-800. These descriptions are included in this WAP for purposes of completeness, but are not enforceable conditions of this WAP or the permit. Refer to Section B.6.
- **Quality Assurance and Quality Control** - ensures the accuracy and precision of sampling and analysis activities. Refer to Section B.7.

This WAP meets the specific requirements of the following:

- Land Disposal Restrictions Treatment Exemption for the LERF under 40 CFR 268.4, U.S. Environmental Protection Agency (EPA), December 6, 1994 (EPA 1994).
- Final Delisting 200 Area ETF [40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3)].
- Corresponding State Final Delisting issued pursuant to WAC 173-303-910(3).
- Discharge Permit Number ST0004500, as amended.
- Hanford Facility Dangerous Waste Permit (Permit) WA7890008967, as amended.

Some Permit requirements from Discharge Permit Number ST0004500 are included in this WAP for completeness. In addition, generator requirements for designation of wastes generated by LERF and 200 Area ETF from operation and maintenance activities are also included in this WAP for completeness. The Discharge Permit Number ST0004500 requirements are not within the scope of Resource Conservation and Recovery Act (RCRA) or WAC 173-303 or subject to the permit requirements of WAC 173-303-800. Therefore, revisions of this WAP that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to review or approval by Ecology. Any other revisions to this WAP will be incorporated through the Permit modification process as necessary to demonstrate compliance with requirements of this Permit, including Permit Conditions I.E.7 and I.E.8.

B.1.1 Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility Description

The LERF and 200 Area ETF comprise an aqueous waste treatment system located in the 200 East Area. Both LERF and 200 Area ETF may receive aqueous waste through several inlets. 200 Area ETF can receive aqueous waste through three inlets. First, 200 Area ETF can receive aqueous waste directly from the LERF. Second, aqueous waste can be transferred from the 2025-ED Load-In Station to 200 Area ETF. Third, aqueous waste can be transferred from containers (e.g., carboys, drums) to the 200 Area ETF through either the Secondary Waste Receiving Tanks or the Concentrate Tanks. The Load-In Station is located just east of building 2025-E and currently consists of three storage tanks and a pipeline that connects to either LERF or 200 Area ETF through fiberglass pipelines with secondary containment.

The LERF can receive aqueous waste through four inlets. First, aqueous waste can be transferred to LERF through a dedicated pipeline from the 200 West Area. Second, aqueous waste can be transferred through a pipeline that connects LERF with the 242-A Evaporator. Third, aqueous waste also can be transferred to LERF from a pipeline that connects LERF to the Load-In Station. Finally, aqueous waste can be transferred into LERF through a series of sample ports located at each basin.

The LERF consists of three lined surface impoundments with a nominal capacity of 29.5 million liters each. Aqueous waste from LERF is pumped to 200 Area ETF through a double walled fiberglass pipeline. The pipeline is equipped with leak detection located in the annulus between the inner and outer pipes. Each basin is equipped with six available sample risers constructed of 15.2-centimeter (6-inch)-perforated pipe. A seventh sample riser in each basin is dedicated to influent waste receipt piping, and an eighth riser in each basin contains liquid level instrumentation. Each riser extends along the sides of each basin from the top to the bottom of the basin. Detailed information on the construction and operation of the LERF is provided in Addendum C, Process Information.

200 Area ETF is designed to treat the contaminants anticipated in process condensate from the 242-A Evaporator and other aqueous wastes from the Hanford Site. Section B.1.2 provides more information on the sources of these wastes.

The capabilities of 200 Area ETF were confirmed through pilot plant testing. A pilot plant was used to test surrogate solutions that contained constituents of concern anticipated in aqueous wastes on the Hanford Site. The pilot plant testing served as the basis for a demonstration of the treatment capabilities of 200 Area ETF in the *200 Area Effluent Treatment Facility Delisting Petition* (DOE/RL-92-72).

200 Area ETF consists of a primary and a secondary treatment train (Figure C.4 and C.5). The primary treatment train removes or destroys dangerous and mixed waste components from the aqueous waste.

In the secondary treatment train, the waste components are concentrated and dried into a powder. This waste is containerized, and transferred to a waste treatment, storage, and/or disposal (TSD) unit.

Each treatment train consists of a series of operations. The primary treatment train includes the following:

- Surge tank
- Filtration
- Ultraviolet light oxidation (UV/OX)
- pH adjustment
- Hydrogen peroxide decomposition
- Degasification
- Reverse osmosis (RO)
- Ion exchange
- Final pH adjustment and verification

The secondary treatment train uses the following:

- Secondary waste receiving
- Evaporation (with mechanical vapor recompression)
- Concentrate staging
- Thin film drying
- Container handling
- Supporting systems

A dry powder waste is generated from the secondary treatment train, from the treatment of an aqueous waste. The secondary waste treatment system typically receives and processes by-products generated from the primary treatment train. However, in an alternate operating scenario, some aqueous wastes may be fed to the secondary treatment train before the primary treatment train.

The treated effluent is contained in verification tanks where the effluent is sampled to confirm that the effluent meets the delisting criteria. Under 40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3), the treated effluent from 200 Area ETF is considered a delisted waste; that is, the treated effluent is no longer a listed dangerous waste subject to the hazardous waste management requirements of RCRA provided that the delisting criteria are satisfied and the treated effluent does not exhibit a dangerous characteristic. The treated effluent is discharged under the Discharge Permit Number ST0004500 as a nondangerous, delisted waste to the SALDS, located in the 600 Area, north of the 200 West Area. A portion of the treated wastewater from the Verification Tanks is recycled as service water throughout the facility; for example, it is used to dilute bulk acid and caustic to meet processing needs, thereby reducing the demand for process water.

B.1.2 Sources of Aqueous Waste

200 Area ETF was intended and designed to treat a variety of mixed wastes. However, process condensate from the 242-A Evaporator was the only mixed waste initially identified for storage and treatment in the LERF and 200 Area ETF. As cleanup activities at Hanford progress, many of the aqueous wastes generated from site remediation and waste management activities are sent to the LERF and 200 Area ETF for treatment and storage. A brief discussion of waste streams that may be managed by LERF and 200 Area ETF in the future may be found in the 200 Area ETF Delisting Petition (DOE/RL-92-72). Prior to management of any new waste streams, it may be necessary to modify this WAP through

the permit modification process to ensure that adequate knowledge of such new waste streams is available prior to management of them in LERF and 200 Area ETF.

The 242-A process condensate is a dangerous waste because it is derived from a listed, dangerous waste stored in the Double-Shell Tank (DST) System. The DST waste is transferred to the 242-A Evaporator where the waste is concentrated through an evaporation process. The concentrated slurry waste is returned to the DST System, and the evaporated portion of the waste is recondensed, collected, and transferred as process condensate to the LERF.

Other aqueous wastes that are treated and stored at the LERF and 200 Area ETF include, but are not limited to the following Hanford wastes:

- Contaminated groundwater from pump-and-treat remediation activities such as groundwater from the 200-UP-1 Operable Unit.
- Purgewater from groundwater monitoring activities.
- Water from deactivation activities, such as water from the spent fuel storage basins at deactivated reactors (e.g., N Reactor).
- Laboratory aqueous waste from unused samples and sample analyses.
- Leachate from landfills, such as the Environmental Restoration Disposal Facility.
- Any dilute waste, which may be accepted for treatment and within the scope of wastewaters that maybe delisted under terms of the revised delisting (40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3)).

Most of these aqueous wastes are accumulated in batches in a LERF basin for interim storage and treatment through pH and flow equalization before final treatment in 200 Area ETF. However, some aqueous wastes, such as 200-UP-1 Groundwater, maybe treated on a flow through basis in LERF en route to 200 Area ETF for final treatment. The constituents in these aqueous wastes are common to the Hanford Site and were considered in pilot plant testing or in vendor tests, either as a constituent or as a family of constituents. According to the Final Delisting 200 Area ETF, and Permit Condition III.3.B.7, all wastes accepted for treatment at 200 Area ETF must be within a specified treatability envelope that ensures that wastes will be within the treatment capability of 200 Area ETF.

B.2 Influent Waste Acceptance Process

Throughout the acceptance process, there are specific criteria required for an influent waste (i.e., aqueous waste) to be accepted at the LERF and/or 200 Area ETF. These criteria are identified in the following sections and summarized in Table B.2. The process of accepting a waste into the LERF and 200 Area ETF systems involves a series of steps, as follows.

- **Waste information:** The generator of an aqueous waste works with LERF and 200 Area ETF personnel to provide characterization data of the waste stream (Section B.2.1).
- **Waste management decision process:** LERF and 200 Area ETF management decision is based on a case-by-case evaluation of whether an aqueous waste stream is acceptable for treatment or storage at LERF and the 200 Area ETF. The evaluation has two categories:
    - **Regulatory acceptability:** a review to determine if there are any, regulatory concerns that would prohibit the storage or treatment of an aqueous waste in the LERF or 200 Area ETF; e.g., treatment would meet permit conditions that would comply with applicable regulations.
    - **Operational acceptability:** an evaluation to determine if there are any operational concerns that would prohibit the storage or treatment of an aqueous waste in the LERF or 200 Area ETF and storage of treatment residuals; e.g., determine treatability and compatibility or safety considerations (Section B.2.2.2).

B.2.1 Waste Information

When an aqueous waste stream is identified for treatment or storage in the LERF or 200 Area ETF, the generator is required to characterize the waste stream according to the requirements in Section B.2.1.1 and document the results of characterization on an aqueous waste profile sheet. This requirement is the first waste acceptance criterion.

The LERF and 200 Area ETF personnel work with the generators to ensure that the necessary information is collected for the characterization of a waste stream (i.e., the appropriate analyses or adequate knowledge), and that the information provided on the waste profile sheet is complete. The completed waste profile sheet is maintained in the Hanford Facility Operating Record, LERF and 200 Area ETF File according to Permit Condition II.I.1.j.

B.2.1.1 Waste Characterization

Because the constituents in the individual aqueous waste streams vary, each waste stream is characterized and evaluated for acceptability on a case-by-case basis. The generator is required to designate an aqueous waste, which generally will be based on analytical data. However, a generator may use knowledge to substantiate the waste designation, or for general characterization information. Examples of acceptable knowledge include the following:

- Documented data or information on processes similar to that which generated the aqueous waste stream.
- Information/documentation that the waste stream is from specific, well documented processes, e.g., F-listed wastes.
- Information/documentation that sampling/analyzing a waste stream would pose health and safety risks to personnel.
- Information/documentation that the waste stream does not lend itself to collecting a laboratory sample for example, wastewater collected (e.g., sump, tank) where the source water characterization is documented. Typically, these circumstances occur at decommissioned buildings or locations, not at operating units.

When a generator performs characterization of a dangerous and/or mixed waste stream based on knowledge, LERF and 200 Area ETF personnel review the knowledge as part of the waste acceptance process to ensure the knowledge satisfies the definition of *knowledge* in WAC 173-303-040. Specifically, LERF and 200 Area ETF personnel review the generator's processes to verify the integrity of the knowledge, and determine whether the knowledge is current and consistent with requirements of this WAP. LERF and 200 Area ETF management or their designee determines the final decision on the adequacy of the knowledge. The persons reviewing generator process knowledge and those making decisions on the adequacy of knowledge are trained according to the requirements of Addendum G, Personnel Training.

The generator is also responsible for identifying Land Disposal Restrictions (LDRs) treatment standards applicable to the influent aqueous waste as part of the characterization, as required under 40 CFR 268.40 incorporated by reference by WAC 173-303-140. Because the 200 Area ETF main treatment train is a Clean Water Act, equivalent treatment unit [40 CFR 268.37(a)] incorporated by reference by WAC 173-303-140, generators are not required to identify underlying hazardous constituents for characteristic wastes pursuant to 40 CFR 268.9, incorporated by reference by WAC 173-303-140, for wastewaters (i.e., <1 percent total suspended solids and <1 percent total organic carbon). The 200 Area ETF secondary waste (e.g., powder) reflects a change in LDR treatability group (i.e., wastewater to non-wastewater) so there is a new LDR point of generation, at which point any characteristic and associated underlying hazardous constituents must be identified. Therefore, generators of a non-wastewater may be required to identify underlying hazardous constituents for characteristic wastes pursuant to 40 CFR 268.9, incorporated by reference by WAC 173-303-140.

When analyzing an aqueous waste stream for LERF and 200 Area ETF waste acceptance characterization, a generator is required to use the target list of parameters identified in Table B.3, of this WAP. This requirement is in addition to any analysis required for purposes of designation under WAC 173-303-070. These data are used by LERF and 200 Area ETF to verify the treatability of an aqueous waste stream, and to develop a treatment plan for the waste after acceptance. Refer to Table B.6, for the corresponding analytical methods. The generator may use knowledge in lieu of some analyses, as determined by LERF and 200 Area ETF management or their designee, if the knowledge satisfies the definition of *knowledge* in WAC 173-303-040. For example if a generator provides information that the process generating an aqueous waste does not include or involve organic chemicals, analyses for organic compounds likely would not be required. Additional analyses could be required if historical information and/or knowledge indicate that an aqueous waste contains constituents not included in the target list of parameters.

The characterization and historical information are documented in the waste profile sheet, which is discussed in the following section and is part of the Hanford Facility Operating Record, LERF and 200 Area ETF File according to Permit Condition II.I.

B.2.1.2 Aqueous Waste Profile Sheet

The waste profile sheet documents the characterization of each new aqueous waste stream. The profile includes a detailed description of the source, volume, waste designation and applicable LDR treatment standards, and physical nature (wastewater or non-wastewater) of the aqueous waste. For an aqueous waste to be accepted for treatment or storage in the LERF or 200 Area ETF, each new waste stream generator is required to complete and provide this form to LERF and 200 Area ETF management. Each generator also is required to provide the analytical data and/or knowledge used to designate the aqueous waste stream according to WAC 173-303-070 and to determine the chemical and physical nature of the waste.

The LERF and 200 Area ETF management determine whether the information on the waste profile sheet is sufficient according to the criteria above. The LERF and 200 Area ETF management use this information to evaluate the acceptability of the aqueous waste stream for storage and treatment in the LERF and 200 Area ETF, and to determine if the secondary waste generated from treatment is acceptable for storage at the 200 Area ETF and has a defined path forward to final disposal.

B.2.2 Waste Management Decision Process

All aqueous waste under consideration for acceptance must be characterized using analytical data and/or knowledge. This information is used to determine the acceptability of an aqueous waste stream. The LERF and 200 Area ETF Facility Manager or their designee is responsible for making the decision to accept or reject an aqueous waste stream. The management decision to accept any aqueous waste stream is based on an evaluation of regulatory acceptability and operational acceptability. Each evaluation uses acceptance criteria, which were developed to ensure that an aqueous waste is managed in a safe, environmentally sound, and in compliance with this Permit. The following sections provide detail on the acceptance evaluation and the acceptance criteria.

An aqueous waste stream could be rejected for one of the following reasons:

- The paperwork and/or laboratory analyses from the generator are insufficient.
- Discrepancies with the regulatory and operational acceptance criteria cannot be reconciled, including:
    - An aqueous waste, which is not allowed under the current Final Delisting 200 Area ETF, and LERF and 200 Area ETF management elect not to pursue an amendment, or the Final Delisting 200 Area ETF cannot be amended (Section B.2.2.1).
    - An aqueous waste is incompatible with LERF liner materials or with other aqueous waste in LERF and no other management method is available (Section B.2.2.3.1).
- Adequate storage or treatment capacity is not available.

B.2.2.1 Regulatory Acceptability

Each aqueous waste stream is evaluated on a case-by-case basis to determine if there are any regulatory concerns that would preclude the storage or treatment of a waste in the LERF or 200 Area ETF based on the criteria in Sections B.2.2.1.1. Before an aqueous waste can be stored or treated in either the LERF or 200 Area ETF, the waste designation must be determined. Information on the waste designation of an aqueous waste is documented in the waste profile sheet. This information is used to confirm that treating or storing the aqueous waste in the LERF or 200 Area ETF is allowed under and in compliance with WAC 173-303, Permit (WA7890008967), Final Delisting 200 Area ETF in 40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3), and the corresponding State-Issued Delisting for 200 Area ETF.

B.2.2.1.1 Dangerous Waste Regulations, State and Federal Delisting Actions, and Permits

Before an aqueous waste stream is sent to the LERF or 200 Area ETF, the generator will characterize and designate the stream with the appropriate dangerous/hazardous waste numbers according to WAC 173-303-070. Addendum A, the Final Delisting 200 Area ETF and the corresponding State-Issued Delisting identify the specific waste numbers for dangerous/mixed waste that can be managed in the LERF and 200 Area ETF. Dangerous waste designated with waste numbers not specified in these documents cannot be treated or stored in the LERF or 200 Area ETF, unless the documents are appropriately modified.

Additionally, aqueous wastes designated with listed waste numbers identified in the Final Delisting 200 Area ETF and the corresponding State-Issued Delisting will be managed in accordance with the conditions of the delisting, or an amended delisting.

B.2.2.2 Operational Acceptability

Because the operating configuration or operating parameters at the LERF and 200 Area ETF can be adjusted or modified, most aqueous waste streams generated on the Hanford Site can be effectively treated to below Delisting and Discharge Permit limits. Because of this flexibility, it would be impractical to define numerical acceptance or decision limits. Such limits would constrain the acceptance of appropriate aqueous waste streams for treatment at the LERF and 200 Area ETF. The versatility of the LERF and 200 Area ETF is better explained in the following examples:

- The typical operating configuration of 200 Area ETF is to process an aqueous waste through the UV/OX unit first, followed by the RO unit. However, high concentrations of nitrates may interfere with the performance of the UV/OX. In this case, 200 Area ETF could be configured to process the waste in the RO unit prior to the UV/OX unit.
- For a small volume aqueous waste with high concentrations of some anions and metals, the approach may be to first process the waste stream in the secondary treatment train. This approach would prevent premature fouling or scaling of the RO unit. The liquid portion (i.e., untreated overheads from 200 Area ETF evaporator and thin film dryer) would be sent to the primary treatment train.
- An aqueous waste with high concentrations of chlorides and fluorides may cause corrosion problems when concentrated in the secondary treatment train. One approach is to adjust the corrosion control measures in the secondary treatment train. An alternative may be to blend this aqueous waste in a LERF basin with another aqueous waste, which has sufficient dissolved solids, such that the concentration of the chlorides in the secondary treatment train would not pose a corrosion concern.
- Some metal salts (e.g., barium sulfate) tend to scale the RO membranes. In this situation, descalants used in the treatment process may be increased.
- Any effluent that does not meet these limits in one pass through 200 Area ETF treatment process is recycled to 200 Area ETF for re-processing.

There are some aqueous wastes, whose chemical and physical properties preclude that waste from being treated or stored at the LERF or 200 Area ETF. Accordingly, an aqueous waste is evaluated to determine if it is treatable, if it would impair the efficiency or integrity of the LERF or 200 Area ETF, and if it is compatible with materials in these units. This evaluation also determines if the aqueous waste is compatible with other aqueous wastes managed in the LERF.

The waste acceptance criteria in this category focus on determining treatability of an aqueous waste stream, and on determining any operational concerns that would prohibit the storage or treatment of an aqueous waste stream in the LERF or 200 Area ETF. The chemical and physical properties of an aqueous waste stream are determined as part of the waste characterization, and are documented on the waste profile sheet and compared to the design of the units to determine whether an aqueous waste stream is appropriate for storage and treatment in the LERF and 200 Area ETF. All decisions and supporting rationale and data will be documented in the Hanford Facility Operating Record, LERF and 200 Area ETF File according to Permit Condition II.I.

B.2.2.3 Special Requirements Pertaining to Land Disposal Restrictions

Containers of 200 Area ETF secondary waste are transferred to a storage or final disposal unit, as appropriate (e.g., the Central Waste Complex or to the Environmental Restoration Disposal Facility). 200 Area ETF personnel provide the analytical characterization data and necessary process knowledge for the waste to be managed by the receiving staff, and the appropriate LDR documentation.

The following information on the secondary waste is included on the LDR documentation provided to the receiving unit:

- Dangerous waste numbers (as applicable)
- Determination on whether the waste is restricted from land disposal according to the requirements of 40 CFR 268 incorporated by reference by WAC 173-303-140 (i.e., the LDR status of the waste)

The waste tracking information associated with the transfer of waste

- Waste analysis results

Generally, the operating parameters or operating configuration at the LERF or 200 Area ETF can be adjusted or modified to accommodate these properties. However, in those cases where a treatment process or operating configuration cannot be modified, the aqueous waste stream will be excluded from treatment or storage at the LERF or 200 Area ETF. Additionally, an aqueous waste stream is evaluated for the potential to deposit solids in a LERF basin (i.e., whether an aqueous waste contains sludge or could precipitate solids). This evaluation will also consider whether the blending or mixing of two or more aqueous waste streams will result in the formation of a precipitate. However, because the waste streams managed in the LERF and 200 Area ETF are generally dilute, the potential for mixing waste streams and forming a precipitate is low; no specific compatibility tests are performed. Filtration at the waste source could be required before acceptance into LERF. Waste streams with the potential to form precipitates in LERF or that cannot be blended with other waste streams to avoid precipitate formation are not accepted for treatment at LERF and 200 Area ETF. The 2025-ED Load-In Station has the ability to perform filtration on incoming waste streams going to both the LERF and 2025-ED Load In Station. See additional discussions of precipitate formation and compliance with LDR requirements in Section B.3. Similar filtration requirements could apply to aqueous waste fed directly to 200 Area ETF without interim treatment in LERF.

To determine if an aqueous waste meets the criterion of treatability, specific information is required. Treatability of a waste stream is evaluated from characterization data provided by the generator as verified through the waste acceptance process, the 200 Area waste acceptance criteria, and the treatability envelope for the 200 Area ETF as documented in Tables C.1 and C.2 of the November 29, 2001 delisting petition. Generators will also provide characterization data to identify those physical and chemical properties that would interfere with, or foul 200 Area ETF treatment process in consultation with LERF and 200 Area ETF representatives. In some instances, knowledge that meets the definition of *knowledge* in WAC 173-303-040 is used for purposes of identifying a chemical or physical property that would be of concern. For example, the generator could provide knowledge that the stream has two phases (an oily phase and an aqueous phase). In this case, if the generator could not physically separate the two phases, the aqueous waste stream would be rejected because the oily phase could compromise some of the treatment equipment. Typically, analyses for the following parameters are required to evaluate treatability and operational concerns:

- total dissolved solids
- total organic carbon
- total suspended solids
- specific conductivity
- pH
- alkalinity
- ammonia
- barium
- calcium
- chloride
- fluoride
- iron
- magnesium
- nitrate
- nitrite
- phosphate
- potassium
- silicon
- sodium
- sulfate

These constituents are identified in Table B.2, which is the list of target analytes used for waste characterization and waste acceptance evaluation.

B.2.2.3.1 Compatibility

Corrosion Control. Because of the materials of construction used in 200 Area ETF, corrosion is generally not a concern with new aqueous waste streams. Additionally, these waste streams are managed in a manner that minimizes corrosion. To ensure that a waste will not compromise the integrity of 200 Area ETF tanks and process equipment, each waste stream is assessed for its corrosion potential as part of the compatibility evaluation. This assessment usually focuses on chloride and fluoride concentrations; however, the chemistry of each new waste also is evaluated for other parameters that could cause corrosion.

Compatibility with Liquid Effluent Retention Facility Liner and Piping. As part of the acceptance process, the criteria of compatibility with the LERF liner materials are evaluated for each aqueous waste stream. This evaluation is performed using knowledge (as defined by WAC 173-303-040) of constituent concentrations in the aqueous waste stream or using constituent concentrations obtained by analyzing the waste stream for the constituents identified in Table B.1 using the analytical methods for these constituents in Section B.8. Then, the constituent concentrations in the waste stream are compared to the decision criteria in Table B.1. If all constituent concentrations are below the decision criteria, then the waste stream is considered compatible with the LERF liner and may be accepted for treatment. Otherwise, the waste stream is considered incompatible with the LERF liner, and it cannot be accepted for treatment in the LERF basins. However, a waste stream may still be acceptable for treatment in 200 Area ETF if it is fed directly to 200 Area ETF, bypassing the LERF Basins. Results of this evaluation are documented in the Hanford Facility Operating Record, LERF and 200 Area ETF File according to Permit Condition II.I. The rational for establishing the liner compatibility constituents and decision criteria in Table B.1 is as follows: The high-density polyethylene liners in the LERF basins potentially are vulnerable to the presence of certain constituents that might be present in some aqueous waste. Using EPA SW-846, Method 9090, the liner materials were tested to evaluate compatibility between aqueous waste stored in the LERF and synthetic liner components. Based on the data from the compatibility test and vendor data on the liner materials, several constituents and parameters were identified as potentially harmful (at high concentrations) to the integrity of the liners. From these data and the application of safety factors, concentration limits in Table B.1 were established.

The strategy for protecting the integrity of a LERF liner is to establish upfront that an aqueous waste is compatible before the waste is accepted into LERF. Characterization data on each new aqueous waste stream are compared to the limits outlined in Table B.1 to ensure compatibility with the LERF liner material before acceptance into the LERF.

Before a waste stream is processed at the 242-A Evaporator, the generator reviews DST analytical data and a process condensate profile is developed to ensure the process condensate is compatible with the LERF liner. For flow through aqueous wastes like the 200-UP-1 Groundwater, characterization data will be obtained and reviewed every two years to ensure that liner compatibility is maintained.

In some instances, knowledge may be adequate to determine that an aqueous waste is compatible with the LERF liner. When knowledge is used, it must satisfy the definition of *knowledge* in WAC 173-303-040. In those instances where knowledge is adequate, the waste characterization would likely not require analysis for these parameters and constituents. Storm water is an example where knowledge is adequate to determine that this aqueous waste is compatible with the LERF liner.

Compatibility with Other Waste. Some aqueous wastes, especially small volume streams, are accumulated in the LERF with other aqueous waste. Before acceptance into the LERF, the aqueous waste stream is evaluated for its compatibility with the resident aqueous waste(s). The evaluation focuses on the potential for an aqueous waste to react with another waste (40 CFR 264, Appendix V, *Examples of Potentially Incompatible Wastes*) including formation of any precipitate in the LERF basins.

However, the potential for problems associated with commingling aqueous wastes is very low due to the dilute nature of the wastes; this evaluation confirms the compatibility of two or more aqueous wastes from different sources. Compatibility is determined by evaluating parameters such as pH, ammonia, and chloride. No specific analytical test for compatibility is performed.

If it is determined that an aqueous waste stream is incompatible with other aqueous waste streams, alternate management scenarios are available. For example, another LERF basin that contains a compatible aqueous waste(s) might be used, or the aqueous waste stream might be fed directly into 200 Area ETF for treatment. In any case, potentially incompatible waste streams are not mixed, and all aqueous waste is managed in a way that precludes a reaction, degradation of the liner, or interference with 200 Area ETF treatment process.

B.2.3 Periodic Review Process

In accordance with WAC 173-303-300(4)(a), an influent aqueous waste will be periodically reviewed as necessary to ensure that the characterization is accurate and current. At a minimum, an aqueous waste stream will be reviewed in the following situations.

- The LERF and 200 Area ETF management have been notified, or have reason to believe that the process generating the waste has changed.
- The LERF and 200 Area ETF management note an increase or decrease in the concentration of a constituent in an aqueous waste stream, beyond the range of concentrations that was described or predicted in the waste characterization.
- Waste streams will be reviewed every two years.

In these situations, LERF and 200 Area ETF management will review the available information. If existing analytical information is not sufficient, the generator may be asked to review and update the current waste characterization, to supply a new WPS, or re-sample and re-analyze the aqueous waste, as necessary. Other situations that might require a re-evaluation of a waste stream are discussed in the following sections.

B.2.4 Record/Information and Decision

The information and data collected throughout the acceptance process, and the evaluation and decision on whether to accept an influent aqueous waste stream for treatment or storage in the LERF or 200 Area ETF are documented as part of Hanford Facility Operating Record, LERF and 200 Area ETF File pursuant to

Permit Condition II.I. Specifically, the Hanford Facility Operating Record, LERF and 200 Area ETF File contains the following components on a new influent aqueous waste stream:

- The signed WPS for each aqueous waste stream and analytical data.
- Knowledge used to characterize a dangerous/mixed waste (under WAC 173-303), and information supporting the adequacy of the knowledge.
- The evaluation on whether an aqueous waste stream meets the waste acceptance criteria, including:
  - The evaluation for regulatory acceptability including appropriate regulatory approvals.
  - The evaluation for LERF liner compatibility and for compatibility with other aqueous waste.

Table B.1. General Limits for Liner Compatibility

Chemical Family	Constituent(s) or Parameter(s)[1]	Limit[2] (sum of constituent concentrations)
Alcohol/glycol	1-butanol	500,000 mg/L 500,000 ppm
Alkanone[3]	acetone	200,000 mg/L 200,000 ppm
Alkenone[4]	none targeted	N/A
Aromatic/cyclic hydrocarbon	acetophenone, benzene, carbozole, chrysene, cresol, di-n-octyl phthalate, diphenylamine, isophorone, pyridine, tetrahydrofuran	2,000 mg/L 2,000 ppm
Halogenated hydrocarbon	arochlors, carbon tetrachloride, chloroform, hexachlorobenzene, lindane (gamma-BHC), hexachlorocyclopentadiene, methylene chloride, p-chloroaniline, tetrachloroethylene, 2,4,6-trichlorophenol	2,000 mg/L 2,000 ppm
Aliphatic hydrocarbon	none targeted	N/A
Ether	dichloroisopropyl ether	2,000 mg/L 2,000 ppm
Other hydrocarbons	acetontrile, carbon disulfide, n-nitrosodimethylamine, tributyl phosphate	2,000 mg/L 2,000 ppm
Oxidizers	none targeted	NA
Acids, Bases, Salts	ammonia, cyanide, anions, cations	100,000 mg/L 100,000 ppm
pH	pH	$0.5 < pH < 13.0$

[1]Analytical methods for the parameters and constituents are provided in Section B.8.

[2]Analytical data are evaluated using the following 'sum of the fraction' technique. The individual constituent concentration is evaluated against the compatibility limit for its chemical family. The sum of the evaluations must be less than 1. pH is not part of this evaluation.

$$\sum_{n=1}^{i}\left(\frac{Conc_n}{LIMIT_n}\right) \leq 1$$

[3]Ketone containing saturated alkyl group(s)

[4]Ketone containing unsaturated alkyl group(s)

Where 'i' is the number of organic constituents detected

mg/L = milligrams per liter

ppm = parts per million

NA = not applicable

Table B.2. Waste Acceptance Criteria

General Criteria Category	Criteria Description
1. Characterization	A. Each generator must provide an aqueous waste profile.
	B. Each generator must designate the aqueous waste stream.
	C. Each generator must provide analytical data and/or knowledge.
2. Regulatory acceptability	A. The LERF and 200 Area ETF can store and treat influent aqueous wastes with waste numbers identified in Addendum A for the LERF and 200 Area ETF, and the Final Delisting 200 Area ETF, 40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3).
	B. The aqueous waste must comply with conditions of the Discharge Permit.
3. Operational acceptability	A. Determine whether an aqueous waste stream is treatable, considering: 1. Whether the removal and destruction efficiencies on the constituents of concern will be adequate to meet the Discharge Permit and Delisting levels 2. Other treatability concerns; analyses for this evaluation may include: total dissolved solids, iron total organic carbon, magnesium total suspended solids, nitrate specific conductivity, nitrite alkalinity, phosphate ammonia, potassium barium, silicon calcium, sodium chloride, sulfate fluoride, pH
	B. Determine whether an aqueous waste stream is compatible, considering: 1. Whether an aqueous waste stream presents corrosion concerns with respect to 200 Area ETF; analysis may include chloride and fluoride. 2. Whether an aqueous waste stream is compatible with LERF liner materials, compare characterization data to the liner compatibility limits (Table B.1). 3. Whether an aqueous waste stream is compatible with other aqueous waste(s), 40 CFR 264, Appendix V, comparison will be used.

B.3 Special Management Requirements

Special management requirements for aqueous wastes that are managed in the LERF or 200 Area ETF are discussed in the following section.

B.3.1 Land Disposal Restriction Compliance at Liquid Effluent Retention Facility

Because LERF provides treatment through flow and pH equalization, a surface impoundment treatment exemption from the land disposal restrictions was granted in accordance with 40 CFR 268.4, and WAC 173-303-040. This treatment exemption is subject to several conditions, including a requirement that the WAP address the sampling and analysis of the treatment 'residue' [40 CFR 268.4(a)(2)(i) and WAC 173-303-300(5)(h)(i) and (ii)] to ensure the 'residue' meets applicable treatment standards. Though the term 'residue' is not specifically defined, this condition further requires that sampling must be designed to represent the "sludge and the supernatant" indicating that a residue may have a sludge (solid) and supernatant (liquid) component.

Solid residue is not anticipated to accumulate in a LERF basin for the following reasons:

- Aqueous waste streams containing sludge would not be accepted into LERF under the acceptance criteria of treatability (Section B.2.2.3.1).
- No solid residue was reported from process condensate discharged to LERF in 1995.
- The LERF basins are covered and all incoming air first passes through a breather filter.
- No precipitating or flocculating chemicals are used in flow and pH equalization.
- Multiple waste streams managed in a single LERF basin are evaluated for the formation of precipitates. Wastes that would form precipitates are not accepted for treatment at LERF.

Therefore, the residue component subject to this condition is the supernatant (liquid component). Additionally, an aqueous waste stream is evaluated for the potential to deposit solids in a LERF basin (i.e., an aqueous waste that contains suspended solids). If necessary, filtration at the waste source could be required before acceptance into LERF. Therefore, the residue component in LERF subject to this condition is the supernatant (liquid component). The contingency for removal of solids will be addressed during closure in Addendum H, Closure Plan.

The conditions of the treatment exemption also require that treatment residues (i.e., aqueous wastes), which do not meet the LDR treatment standards "must be removed at least annually" [40 CFR 268.4(a)(2)(ii) incorporated by reference by WAC 173-303-140]. To address the conditions of this exemption, an influent aqueous waste is sampled and analyzed and the LDR status of the aqueous waste is established as part of the acceptance process. The LERF basins are then managed such that any aqueous waste(s), which exceeds an LDR standard, is removed annually from a LERF basin, except for a heel of approximately 1 meter (3 feet). A heel is required to stabilize the LERF liner. The volume of the heel is approximately 2,082,000 liters (550,006 gallons).

B.4 Influent Aqueous Waste Sampling and Analysis

The following sections provide a summary of the sampling procedures, frequencies, and analytical parameters for characterization of influent aqueous waste (Section B.2) and in support of the special management requirements for aqueous waste in the LERF (Section B.3).

B.4.1 Sampling Procedures

With a few exceptions, generators are responsible for the characterization, including sampling and analysis, of an influent aqueous waste. Process condensate is either sampled at the 242-A Evaporator or accumulated in a LERF basin following a 242-A Evaporator campaign and sampled. Other exceptions will be handled on a case-by-case basis and the Hanford Facility Operating Record, LERF and 200 Area ETF File will be maintained at the unit for inspection by Ecology. The following section discusses the sampling locations, methodologies, and frequencies for these aqueous wastes. For samples collected at the LERF and 200 Area ETF, unit-specific sampling protocol is followed. The sample containers, preservation materials, and holding times for each analysis are listed in Section B.8.

B.4.1.1 Batch Samples

In those cases where an aqueous waste is sampled in a LERF basin, samples are collected from four of the six available sample risers located in each basin, i.e., four separate samples. When LERF levels are low, fewer than four samples can be taken if the sampling approach is still representative. Though there are eight sample risers at each basin, one is dedicated to liquid level instrumentation and another is dedicated as an influent port. Operating experience indicates that four samples adequately capture the spatial variability of an aqueous waste stream in the LERF basin. Specifically, sections of stainless steel (or other compatible material) tubing are inserted into the sample riser to an appropriate depth. Using a portable pump, the sample line is flushed with the aqueous waste and the sample collected. The grab sample containers typically are filled for volatile organic compounds (VOC) analysis first, followed by the remainder of the containers for the other parameters.

Several sample ports are also located at 200 Area ETF, including a valve on the recirculation line at 200 Area ETF surge tank, and a sample valve on a tank discharge pump line at the 2025-ED Load-In Station. All samples are obtained at the LERF or 200 Area ETF are collected in a manner consistent with SW-846 procedures (EPA as amended).

B.4.2 Analytical Rationale

As stated previously, each generator is responsible for designating and characterizing an aqueous waste stream. Accordingly, each generator samples and analyzes an influent waste stream using the target list of parameters (Table B.3) for the waste acceptance process. At the discretion of the LERF and 200 Area ETF management, a generator may provide knowledge in lieu of some analyses as discussed in Section B.2.1.1. The LERF and 200 Area ETF personnel will work with the generator to determine which parameters are appropriate for the characterization.

The analytical methods for these parameters are provided in Section B.8. All methods are EPA methods satisfying the requirements of WAC 173-303-110(3). Additional analyses may be required if historical information and knowledge indicate that an influent aqueous waste contains constituents not included in the target list of parameters. For example, if knowledge indicates that an aqueous waste contains a parameter that is regulated by the Groundwater Quality Criteria (WAC 173-200), that parameter(s) would be added to the suite of analyses required for that aqueous waste stream.

The analytical data for the parameters presented in Table B.3, including VOC, Semi-volatile Organic Compound (SVOC), metals, anions, and general chemistry parameters are used to define the physical and chemical properties of the aqueous waste for the following:

- Set operating conditions in the LERF and 200 Area ETF (e.g., to determine operating configuration, refer to Section B.2.2.2).
- Identify concentrations of some constituents which may also interfere with, or foul 200 Area ETF treatment process (e.g., fouling of the RO membranes, refer to Section B.2.2.2).
- Evaluate LERF liner and piping material compatibility.
- Determine treatability to evaluate if applicable constituents in the treated effluent will meet Discharge Permit and Delisting limits.
- Estimate concentrations of some constituents in the waste generated in the secondary treatment train (i.e., dry powder waste).

Table B.3. Target Parameters for Influent Aqueous Waste Analyses

VOLATILE ORGANIC COMPOUNDS		SEMIVOLATILE ORGANIC COMPOUNDS
Acetone		Acetophenone
Acetonitrile		Cresol (o, p, m)
Benzene		Dichloroisopropyl ether (bis(2-chloropropyl)ether)
1-Butanol		Di-n-octyl phthalate
Carbon disulfide		Diphenylamine
Carbon tetrachloride		Hexachlorobenzene
Chloroform		Hexachlorocyclopentadiene
Methylenechloride		Iosophorone
Tetrachloroethylene		Lindane (gamma-BHC)
Tetrahydrofuran		N-nitrosodimethylamine
		Pyridine
		Tributyl phosphate
		2,4,6-Trichlorophenol
TOTAL METALS		**ANIONS**
Arsenic	Magnesium	Chloride
Barium	Mercury	Fluoride
Beryllium	Nickel	Nitrate
Cadmium	Potassium	Nitrite
Calcium	Selenium	Phosphate
Chromium	Silicon	Sulfate
Copper	Silver	**GENERAL CHEMISTRY PARAMETERS**
Iron	Sodium	Ammonia
Lead	Vanadium	Cyanide
	Zinc	pH
		Total suspended solids
		Total dissolved solids
		Total organic carbon
		Specific conductivity

B.5 Treated Effluent Sampling and Analysis

The treated aqueous waste, or effluent, from 200 Area ETF is collected in three 3,025,739-liter (799,316-gallons) verification tanks before discharge to the SALDS. To determine whether the discharge limits, and the Final Delisting 200 Area ETF criteria are met, the effluent routinely is sampled at the verification tanks. The sampling and analyses performed are described in the following sections.

B.5.1 Rationale for Effluent Analysis Parameter Selection

The parameters measured in the treated effluent are required by the following regulatory documents:

- Delisting criteria from the Final Delisting 200 Area ETF (40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3)).
- Corresponding State Final Delisting issued pursuant to WAC 173-303-910(3).
- Effluent limits from the Discharge Permit Number ST0004500.

- The Final Delisting 200 Area ETF provides two testing regimes for the treated effluent. Initial verification testing is performed when a new influent waste stream is processed through the 200 Area ETF. For each 200 Area ETF influent waste stream, the first generated verification tank must be sampled and analyzed for all delisting constituents and conductivity. Subsequent verification sampling and analysis of all delisting parameters is performed on every 15th tank of that 200 Area ETF influent waste stream. If the concentration of any analyte is found to exceed a Discharge Permit Number ST0004500, enforcement limit or a Delisting criterion, the contents of the verification tank are reprocessed and/or re-analyzed. The next verification tank generated is also sampled for all delisting constituents.

B.5.2 Effluent Sampling Strategy: Methods, Location, Analyses, and Frequency

Effluent sampling methods and locations, the analyses performed, and frequency of sampling are discussed in the following sections.

B.5.2.1 Effluent Sampling Method and Location

Samples of treated effluent are collected and analyzed to verify the treatment process using 200 Area ETF specific sampling protocol. These verification samples are collected at a sampling port on the verification tank recirculation line. Section B.8 presents the sample containers, preservatives, and holding times for each parameter monitored in the effluent.

B.5.2.2 Analyses of Effluent

The parameters required by the current Discharge Permit Number ST0004500, and Final Delisting 200 Area ETF, conditions are presented in Table B.4. The analytical methods and PQLs associated with each parameter are provided in Section B.8. The methods and PQLs are equivalent to those used in the analysis of influent aqueous waste.

B.5.2.3 Frequency of Sampling

Treated effluent is tested for all parameters listed in Table B.4 on a frequency satisfying the permit conditions of the Discharge Permit Number ST0004500, and the Final Delisting 200 Area ETF. This effluent must meet the Discharge Permit Number ST0004500, and Final Delisting 200 Area ETF limits associated with these parameters. Grab samples are collected from each verification tank.

During operation of 200 Area ETF, if one or more of the constituents exceeds a Delisting criterion, the Delisting conditions require:

- The characterization data and processing strategy of the influent waste stream be reviewed and changed accordingly to ensure the contents of subsequent tanks do not exceed the Delisting criteria.
- The contents of the verification tank are recycled for additional treatment. The contents that are recycled are resampled after treatment to ensure no constituents exceed a Delisting criteria
- The contents of the following verification tank are sampled for compliance with the Delisting criteria.
- Treated effluent that does not meet Discharge Permit Number ST0004500 is not discharged to the SALDS until the tank has been retreated and/or reanalyzed.

B.6 Effluent Treatment Facility Generated Waste Sampling and Analysis

The wastes discussed in this section include the wastes generated at 200 Area ETF and are managed in the container storage areas of 200 Area ETF. This section describes the characterization of the following secondary waste streams generated within 200 Area ETF:

- Secondary waste generated from the treatment process, including the following waste forms:
  - dry powder waste
  - concentrate tanks slurry

  - sludge removed from process tanks
- Waste generated by operations and maintenance activities
- Miscellaneous waste generated within 200 Area ETF.

For each waste stream described, a characterization methodology and rationale are provided, and sampling requirements are addressed.

B.6.1 Secondary Waste Generated from Treatment Processes

The following terms used in this Section, including powder, dry powder, waste powder, and dry waste powder, are equivalent to the term 'dry powder waste'.

A dry powder waste is generated from the secondary treatment train, from the treatment of an aqueous waste. Waste is received in the secondary treatment train in waste receiving tanks where it is fed into an evaporator. Concentrate waste from the evaporator is then fed to a concentrate tank. From these tanks, the waste is fed to a thin film dryer and dried into a powder, and collected into containers. The containers are filled via a remotely controlled system. The condensed overheads from the evaporator and thin film dryer are returned to the surge tank to be fed to the primary treatment train.

Occasionally, salts from the treatment process (e.g., calcium sulfate and magnesium hydroxide) accumulate in process tanks as sludge. Because processing these salts could cause fouling in the thin film dryer, and to allow uninterrupted operation of the treatment process, the sludge is removed and placed in containers. The sludge is dewatered and the supernate is pumped back to 200 Area ETF for treatment.

The secondary treatment system typically receives and processes the following by-products generated from the primary treatment train:

- Concentrate from the first RO stage.
- Backwash from the rough and fine filters.
- Regeneration waste from the ion exchange system.
- Spillage or overflow collected in the process sumps.

In an alternate operating scenario, some aqueous wastes may be fed to the secondary treatment train before the primary treatment train.

B.6.1.1 Special Requirements Pertaining to Land Disposal Restrictions

Containers of 200 Area ETF secondary waste are transferred to a storage or final disposal unit, as appropriate (e.g., the Central Waste Complex or to the Environmental Restoration Disposal Facility). 200 Area ETF personnel provide the analytical characterization data and necessary knowledge for the waste to be managed by the receiving staff, and for the appropriate LDR documentation.

The following information on the secondary waste is included on the LDR documentation provided to the receiving unit:

- Dangerous waste numbers (as applicable).
- Determination on whether the waste is restricted from land disposal according to the requirements of 40 CFR 268 incorporated by reference by WAC 173-303-140 (i.e., the LDR status of the waste).

The waste tracking information associated with the transfer of waste

- Waste analysis results.

B.6.1.2 Sampling Methods

The dry powder waste and containerized sludge are sampled from containers using the principles presented in SW-846 (EPA as amended) and ASTM Methods (American Society for Testing Materials), as referenced in WAC 173-303-110(2). The sample container requirements, sample preservation requirements, and maximum holding times for each of the parameters analyzed in either matrix are presented in Section B.8.

Concentrate tank waste samples are collected from recirculation lines, which provide mixing in the tank during pH adjustment and prevent caking. The protocol for concentrate tank sampling prescribes opening a sample port in the recirculation line to collect samples directly into sample containers. The sample port line is flushed before collecting a grab sample. The VOC sampling typically is performed first for grab samples. Each VOC sample container will be filled such that cavitation at the sample valve is minimized and the container has no headspace. The remainder of the containers for the other parameters will be filled next.

Table B.4. Rationale for Parameters to be Monitored in Treated Effluent

Parameter	(Cas No.)	Final Delisting 200 Area ETF Delisting[1]	ST0004500 Discharge Permit[2]
			Effluent Limit
VOLATILE ORGANIC COMPOUNDS			
Acetone	(67-64-1)	X	X
Acetonitrile	(75-05-8)	X	
Benzene	(71-43-2)	X	X
1-Butanol	(71-36-3)	X	
Carbon disulfide	(75-15-0)	X	
Carbon tetrachloride	(56-23-5)	X	X
Chloroform	(67-66-3)		X
Methylene Chloride	(75-09-2)		M
Tetrachloroethylene	(127-18-4)		X
Tetrahydrofuran	(109-99-9)	X	X
SEMIVOLATILE ORGANIC COMPOUNDS			
Acetophenone	(98-86-2)		X
Carbazole	(86-74-8)	X	
p-Chloroaniline	(106-47-8)	X	
Chrysene	(218-01-9)	X	
Cresol (total)	(1319-77-3)	X	
Dichloroisopropyl ether (bis(2-chloroisopropyl)ether)	(108-60-1)	X	
Di-n-octyl phthalate	(117-84-0)	X	
Diphenylamine	(122-39-4)	X	
Hexachlorobenzene	(118-74-1)	X	
Hexachlorocyclopentadiene	(77-47-4)	X	
Isophorone	(78-59-1)	X	
Lindane (gamma-BHC)	(58-89-9)	X	
N-nitrosodimethylamine	(62-75-9)	X	X
Pyridine	(110-86-1)	X	
Tributyl phosphate	(126-73-8)	X	
2,4,6-Trichlorophenol	(88-06-2)	X	
PCBs			
Aroclor 1016	(12674-11-2)	X	

Table B.4. Rationale for Parameters to be Monitored in Treated Effluent

Parameter	(Cas No.)	Final Delisting 200 Area ETF Delisting[1]	ST0004500 Discharge Permit[2]
			Effluent Limit
Aroclor 1221	(11104-28-2)	X	
Aroclor 1232	(11141-16-5)	X	
Aroclor 1242	(53469-21-9)	X	
Aroclor 1248	(12672-29-6)	X	
Aroclor 1254	(11097-69-1)	X	
Aroclor 1260	(11096-82-5)	X	
TOTAL METALS[3]			
Arsenic	(7440-38-2)	X	X
Barium	(7440-39-3)	X	
Beryllium	(7740-41-7)	X	X
Cadmium	(7440-43-9)	X	X
Chromium	(7440-47-3)	X	X
Copper	(7440-50-8)		X
Lead	(7439-92-1)	X	X
Mercury	(7439-97-6)	X	X
Nickel	(7440-02-0)	X	
Selenium	(7782-49-2)	X	
Silver	(7440-22-4)	X	
Vanadium	(7440-62-2)	X	
Zinc	(7440-66-6)	X	
ANIONS			
Chloride	(16887-00-6)		X
Fluoride	(16984-48-8)	X	
Nitrate (as N)	(14797-55-8)		X
Nitrite (as N)	(1479765-0)		X
Sulfate	(14808-79-8)		X
OTHER ANALYSES			
Ammonia	(7664-41-7)	X	X
Cyanide	(57-12-5)	X	
Total dissolved solids			X
Total organic carbon			X
Total suspended solids			X
Specific conductivity			M

[1]Parameters required by the current conditions of the Final Delisting 200 Area ETF, 40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3),70 FR 44496 (EPA 2005)

[2]Parameters required by the current conditions of the Discharge Permit Number ST0004500

[3]Metals reported as total concentrations

X = Rationale for measuring this parameter in treated effluent

M = Monitor only; no limit defined

PCBs = polychlorinated biphenyls

B.6.1.3 Sampling Frequency

When designation or identification of applicable LDR treatment standards of the 200 Area ETF secondary waste cannot be based on influent characterization data or knowledge as described in Section B.6.1.1, 200 Area ETF secondary waste is sampled on a batch basis. A batch is defined as any volume of aqueous waste that is being treated under consistent and constant process conditions.

When personnel exposures are of concern, one representative sample will be collected from the concentrate tank, if waste from the concentrate tank. The sample will be analyzed for the appropriate parameters identified in Table B.5 based on the needs identified from evaluating influent waste analysis data. If sampling of the concentrate tank is not technically practicable for purposes of designating the powder, direct sampling of the dry powder will be used to make determinations on the dry powder. The dry powder or concentrate tanks will be resampled in the following situations:

- Change in influent characterization.
- Change in process chemistry, as indicated by in-line monitoring of conductivity and pH.
- The LERF and 200 Area ETF management have been notified, or have reason to believe that the process generating the waste has changed (for example, a source change such as a change in the well-head for groundwater that significantly changes the aqueous waste characterization).
- The LERF and 200 Area ETF management note an increase or decrease in the concentration of a constituent in an aqueous waste stream, beyond the range of concentrations that was described or predicted in the waste characterization.

B.6.2 Operations and Maintenance Waste Generated at the 200 Area Effluent Treatment Facility

Operation and maintenance of process and ancillary equipment generates additional routine waste. These waste materials are segregated to ensure proper handling and disposition, and to minimize the commingling of potentially dangerous waste with nondangerous waste. The following waste streams are anticipated to be generated during routine operation and maintenance of 200 Area ETF. This waste might or might not be dangerous waste, depending on the nature of the material and its exposure to a dangerous waste.

- Spent lubricating oils and paint waste from pumps, the dryer rotor, compressors, blowers, and general maintenance activities.
- Spent filter media and process filters.
- Spent ion exchange resin.
- High Efficiency Particulate Air (HEPA) filters.
- UV light tubes.
- RO membranes.
- Equipment that cannot be returned to service.
- Other miscellaneous waste that might contact a dangerous waste (e.g., plastic sheeting, glass, rags, paper, waste solvent, or aerosol cans).

These waste streams are stored at 200 Area ETF before being transferred for final treatment, storage, or disposal as appropriate.

This waste is characterized and designated using knowledge (from previously determined influent aqueous waste composition information); analytical data; and material safety data sheets (MSDS) of the chemical products present in the waste or used (the data sheets are maintained at 200 Area ETF). Sampling of these waste streams is not anticipated; however, if an unidentified or unlabeled waste is discovered, that waste is sampled. This 'unknown' waste is sampled and analyzed for the parameters in

Table B.5 as appropriate, and will be designated according to Washington state regulatory requirements. The specific analytical methods for these analyses are provided in Section B.8.

B.6.3 Other Waste Generated at the 200 Area Effluent Treatment Facility

There are two other potential sources of waste at 200 Area ETF: spills and/or overflows, and discarded chemical products. Spills may be subject to the requirements of Permit Condition II.E. Spilled material that potentially might be dangerous waste generally is either containerized or routed to 200 Area ETF sumps where the material is transferred either to the surge tank for treatment or to the secondary treatment train. In most cases, knowledge and the use of MSDSs are sufficient to designate the waste material. If the source of the spilled material is unknown and the material cannot be routed to 200 Area ETF sumps, a sample of the waste is collected and analyzed according to Table B.5, as necessary, for appropriate characterization of the waste. Unknown wastes will be designated according to Washington State regulatory requirements at WAC 173-303-070. The specific analytical methods for these analyses are provided in Section B.8.

A discarded chemical product waste stream could be generated if process chemicals, cleaning agents, or maintenance products become contaminated or are otherwise rendered unusable. In all cases, these materials are appropriately containerized and designated. Sampling is performed, as appropriate, for waste designation.

Table B.5. 200 Area Effluent Treatment Facility Generated Waste - Sampling and Analysis

Parameter[1]	Rationale
• Total solids or percent water[2]	• Calculate dry weight concentrations
• Volatile organic compounds[3]	• LDR - verify treatment standards
• Semi-volatile organic compounds[3]	• LDR - verify treatment standards
• Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver)	• Waste designation • LDR - verify treatment standards
• Cation and anions of concern	• Address receiving TSD unit waste acceptance requirements
• pH	• Waste designation

[1]For influent and concentrate tank samples, the total sample (solid plus liquid) is analyzed and the analytical result is expressed on a dry weight basis. The result for toxicity characteristic metal and organic is divided by a factor of 20 and compared to the toxicity characteristic (TC) constituent limits [WAC 173-303-090(8)]. If the TC limit is met or exceeded, the waste is designated accordingly. All measured parameters are compared against the corresponding treatment standards.

[2]Total solids or percent water are not determined for unknown waste and dry powder waste samples and are analyzed in maintenance waste and sludge samples, as appropriate (i.e., percent water might not be required for such routine maintenance waste as aerosol cans, fluorescent tubes, waste oils, batteries, etc., or sludge that has dried).

[3]VOC and/or SVOC analysis of secondary waste is required unless influent characterization data and knowledge indicate that the constituent will not be in the final secondary waste at or above the LDR.

LDR = land disposal restrictions

TSD = treatment, storage, and/or disposal

B.7 Quality Assurance/Quality Control

The following quality assurance/quality control (QA/QC) plan for LERF and 200 Area ETF is provided as required by WAC 173-303-810(6) and follows the guidelines of EPA QA/G-5.

B.7.1 Project Management

The following sections address project administrative functions and approaches.

B.7.1.1.1 Project Organization

Overall management of the LERF and 200 Area ETF is performed by the Facility Manager, who is responsible for safe operation of the facility, including implementation of this QA/QC plan and compliance with applicable permits and regulations. The Facility Manager also provides retention of project records in accordance with this plan. Assisting the Facility Manager is an Environmental Field Representative that monitors compliance, reviews new requirements and regulations, and interfaces with EPA and Ecology. Also assisting the Facility Manager is a QA representative who is responsible for implementing the QA program at the facility.

Reporting to the Facility Manager are several support groups. The Operations group consists of trained personnel who operate the plant, including operators performing sampling activities such as collection, packaging, and transportation of samples to the laboratory. The Maintenance group is responsible for performing calibrations and preventative maintenance on facility equipment, including pH, conductivity, and flow meters required by environmental permits. The Engineering group monitors the process with online instruments and sampling for process control. The Engineering group also performs waste acceptance, and environmental compliance activities, including scheduling sampling, generating data forms, and reviewing data.

B.7.1.2 Special Training

Individuals involved in sampling, analysis, and data review will be trained and qualified to implement safely the activities addressed in this WAP and QA/QC plan. Training will conform to the training requirements specified in WAC 173-303-330 and Addendum F, Personnel Training. Training records will be maintained in accordance with Section B.7.1.3.

B.7.1.3 Documentation and Records

Sample records are documented as part of the Hanford Facility Operating Record, LERF and 200 Area ETF File pursuant to Permit Condition II.I. These documents and records include the following:

- Training
- Chains of Custody for all regulatory sampling performed by LERF and 200 Area ETF
- Data Summary Reports
- QA/QC reports
- Assessment reports
- Instrument inspection, maintenance, and calibration logs

B.7.2 Data Quality Parameters and Criteria

Data quality parameters are listed by EPA QA/G-5S, *Guidance for Choosing a Sampling Design for Environmental Data Collection* as:

- Purpose of Data Collection (e.g. determining if a parameter exceeds a threshold level).
- Spatial and Temporal Boundaries of Study.
- Preliminary Estimation of Sample Support (volume that each sample represents).
- Statistical Parameter of Interest (e.g. mean, percentile, percentage).
- Limits on Decision Error/Precision (e.g. false acceptance error, false rejection error).

The parameters for the first four bullets (limits, sample points, frequency of samples, etc.) are already established in the permits, delisting petition, and this WAP. The focus of this QA/QC plan is on limits on decision error/precision.

The data quality parameters were chosen to ensure Limits on Decision Error/Precision are appropriate for purposes of using the data to demonstrate compliance with permits, delisting exclusion limits, and this WAP. The principal quality parameters are precision, accuracy, representativeness, comparability, and completeness. Secondary data parameters of importance include sensitivity and detection levels. The data quality parameters and the data acceptance criteria are discussed below.

B.7.2.1 Precision

Precision is a measure of agreement among replicate measurements of the same property, under prescribed similar conditions. Precision is expressed in terms of the relative percent difference (RPD) for duplicate measurements. QA/QC sample types that test precision include field and laboratory duplicates and spike duplicates. The RPDs for laboratory duplicates and/or matrix spike duplicates will be routinely calculated.

$$\mathrm{RPD} = (100)\,absolute\ value\ of\left(\frac{\text{sample result} - \text{duplicate sample result}}{\text{average of sample result} + \text{duplicate sample result}}\right)$$

Matrix spike duplicates are replicates of matrix spike samples that are analyzed with every analytical batch that contains a 200 Area ETF treated effluent sample. The precision of the analytical methods are estimated from the results of the matrix spike (MS) and the matrix spike duplicate (MSD) for selected analytes. Matrix spike analyses cannot be performed for certain analytical methods, including conductivity, pH, and total dissolved solids. Duplicate analyses are used to determine the RPD for these methods. The precision acceptance criteria are specified in Table B.6.

B.7.2.2 Accuracy

Accuracy assesses the closeness of the measured value to an accepted reference value. Accuracy of analytical results is typically assessed using matrix spikes. A matrix spike is the addition of a known amount of the analyte to the sample matrix being analyzed. Accuracy is expressed as a percent recovery of the spiked samples.

$$\text{Percent Recovery} = 100\left(\frac{\text{matrix spike sample result} - \text{sample result}}{\text{spiked amount}}\right)$$

Matrix spike analyses cannot be performed on certain analytical methods, including conductivity, pH, and total dissolved solids. The percent recovery for the laboratory control standard samples demonstrates that these methods are working properly and gives an estimate of the method's accuracy. The percent recovery will be routinely calculated.

Accuracy criteria are established to provide confidence that the result is below the action level. Therefore the closer the result is to the action level the higher the degree of accuracy needed. The upper and lower accuracy acceptance criteria are specified in Table B.6. The criteria are reasonable values based on previous analysis of constituents in the delisting exclusion, or similar constituents.

B.7.2.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent selected characteristics of a parameter at a sampling point or process condition. Because of the matrix being analyzed, dilute aqueous solution, it is not expected that representativeness will be of concern, except when there are potential for changes to process conditions such as the facility influent concentrations or waste processing strategy. Sampling due to these changes in process conditions is addressed in Section B.6.1.3.

The representativeness of a sample may be compromised by the presence of contaminants introduced in the field or the laboratory. To determine if contamination may be present, a blank sample of reagent water is analyzed. A method blank is performed by the laboratory on every batch of 20 samples being analyzed at the same time. The presence of a constituent in the sample and the blank sample indicates contamination has occurred.

B.7.2.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that were planned to be collected. Lack of completeness is sometimes caused by loss of a sample, loss of data, or inability to collect the planned number of samples. Incompleteness also occurs when data are discarded because they are of unknown or unacceptable quality. Since most regulatory sampling events performed by LERF and 200 Area ETF involve a single sample, all analysis must be complete and valid.

B.7.2.5 Comparability

Comparability is the confidence with which one data set can be compared to another. Comparability is achieved by using sampling and analytical techniques, which provide for measurements that are consistent and representative of the media and conditions measured. In laboratory analysis, the term comparability focuses on method type, holding times, stability issues, and aspects of overall analytical quantitation.

B.7.2.6 Sensitivity and Detection Levels

Sensitivity is the measure of the concentration at which an analytical method can positively identify and report analytical results. Sensitivity represents the maximum value for a detection level that will reasonably assure the results are below the established limits. The analytical method selected by LERF and 200 Area ETF should have a detection level for each constituent that is below the sensitivity. The preferred detection level is the practical quantitation limit (PQL), which is lowest concentration that can be reliably measured during routine laboratory conditions. If the method PQL cannot meet the sensitivity for some constituents, the minimum concentration or attribute that can be measured by a method (method detection limit) or by an instrument (instrument detection limit) may be used. The sensitivity levels, specified in Table B.6, are derived from the delisting limits, water discharge limits, and uncertainty values, which are based on the required precision and accuracy for each constituent.

B.7.3 Data Generation and Acquisition

The following section addresses QA requirements for data generation and acquisition.

B.7.3.1 Sampling Method

LERF and 200 Area ETF samples required by the permits and delisting are collected as grab samples. Sampling for the purpose of waste designation of secondary waste is performed using grab, composite, thief, scoop, or composite liquid waste sampler (COLIWASA). The selection of the sample collection device depends on the type of sample, the sample container, the sampling location, and the nature and distribution of the waste components. In general, the methodologies used for specific materials correspond to those referenced to WAC 173-303-110(2). The selection and use of the sampling device is supervised or performed by a person thoroughly familiar with the sampling requirements.

The following protocol applies to all sampling methods:

- All containers will be filled within as short a time period as reasonably achievable.
- Volatile Organic Analysis (VOA) sample containers will be filled first, and prior to any subdividing of a composited sample.
- VOA samples consisting of a set of two or more sample containers will be filled sequentially. The sample containers are considered equivalent and given identical sampling times.
- All VOA sample containers must have no headspace and be free of trapped air bubbles.

- Grab sample protocol includes:
  - Sample lines should be as short as reasonably achievable and free of traps and pockets in which solids might settle.
  - The sample line should be flushed before sampling with a minimum volume equivalent to three times the sample line volume.
  - Contamination to the sample from contact with the internal and external surfaces of the tap should be minimized.

Thief and COLIWASA samplers are used to sample liquid waste containers such as drums. Scoop samplers are used to sample powder waste generated in the thin-film dryer. Sample requirements for these samples include:

- Thief or COLIWASA sampler, the sampler should be lowered into the liquid slowly so the level of the liquid inside and outside the sampler tube remain about the same.
- When lifting the thief or COLIWASA sampler from the solution, the outside should be wiped down, or the excess water allowed to drip off, before filling the sample container.

B.7.3.2 Sample Handling, Custody, and Shipping

The proper handling of sample bottles after sampling is important to ensure the samples are free of contamination and to demonstrate the samples have not been tampered with.

B.7.3.2.1 Chain-of-Custody

Evidence of collection, shipment, receipt at the laboratory, and laboratory custody until disposal will be documented using a chain-of-custody form. The chain-of-custody form will, as a minimum identify sample identification number, sampling date and time, sampling location, sample bottle type and number, analyses to be performed, and preservation method.

The operations person who signs as the collector on the chain of custody is the first custodian of the samples. A custodian must maintain continuous custody of sample containers at all times from the time the sample is taken until delivery to the laboratory or until delivery to a common carrier for shipment to an off-site location. Custody is maintained by any of the following:

- The custodian has the samples in view, or has placed the samples in locked storage, or keeps the samples within a secured area (e.g., controlled by authorized personnel only), or has applied a tamper-indicating device, such as evidence tape, to the sample containers or shipping containers.
- The custodian has taken physical possession of the samples or the shipping containers sealed with an intact tamper-indicating device, such as evidence tape.

B.7.3.2.2 Sample Preservation, Containers, and Holding Time

Table B.6 lists the sample container, preservation method, and holding time requirements for different types of analyses. These parameters are based on the requirements of 40 CFR 136, Table II.

B.7.3.3 Instrument Calibration and Preventive Maintenance

LERF and 200 Area ETF uses instruments to monitor operations and meet regulatory requirements. This includes continuous pH and conductivity monitors required by facility permits and delisting. All instruments are calibrated according to frequencies and tolerances established by the LERF and 200 Area ETF engineering group. Calibrations and other maintenance actions are scheduled and tracked by LERF and 200 Area ETF maintenance group using a preventive maintenance database. Measuring and test equipment used for instrument calibration is controlled, calibrated at specified intervals, and maintained to establish accuracy limits.

B.7.4 Assessment and Oversight

Quality programs can only be effective if meaningful assessments are performed to monitor and respond to issues associated with program performance. Routine assessment of data is performed as part of the validation process discussed in Section B.7.5.1.

B.7.4.1 Assessments and Response

Management assessments are conducted by first line management and subject matter experts, focusing on procedural adequacy, compliance, and overall effectiveness of the program. Management assessments of the sample program typically include the LERF and 200 Area ETF QA representative. Each management assessment has a performance objective or lines of inquiry. Examples may include personnel training, proper performance of sample custody, or completeness of sampling records.

B.7.4.2 Reports to Management

Results of performance assessments, including any issues identified, are provided to the LERF and 200 Area ETF Facility Manager in a written report. The Facility Manager is responsible to correct all findings from the report.

B.7.5 Verification and Validation of Analytical Data

The data verification and validation processes will ensure that the data resulting from the selected analytical method are consistent with requirements specified in this QA/QC plan.

B.7.5.1 Data Verification

The primary data reporting will be by electronic data systems. Data verification will be performed on laboratory data packages that support environmental compliance to ensure that their content is complete and in order. A review of the data package will be performed to ensure that:

- The data package contains the required technical information.
- Deficiencies are identified and documented.
- Identified deficiencies are corrected by the laboratory and the appropriate revisions are made.
- Deficient pages are replaced with the laboratory corrections.
- A copy of the completed verification report is placed in the data file.

B.7.5.2 Data Validation

Data validation ensures that the data resulting from analytical measurements meet the quality requirements specified in the QA/QC plan. Data validation will be performed on data packages that support environmental compliance.

The following are included in data validation:

- Chain-of-Custody (COC) – Verify the COC shows unbroken custody from sampling through receipt at the laboratory.
- Request analysis – Review the sample results to verify the requested analysis was performed. If an alternate method was used, verify permit-required detection limits were met.
- Holding times – Review the sample results to verify the analyses were performed within required holing times and where applicable, extraction times.
- Blank – Review the results of trip, field, and equipment blank samples to verify the sample results are not compromised by contamination.
- Laboratory QC – Verify the laboratory QC was completed and there are no outstanding problems.

B.8 Analytical Methods, Sample Containers, Preservative Methods, and Holding Times

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent

Parameter	Analytical Method[1]	Method PQL Sensitivity[2]	Accuracy/ Precision for Method[3] (percent)	Sample container[4]/ Preservative[4]/ Holding time[5]
VOLATILE ORGANIC COMPOUNDS				
Acetone	SW-846 8260 or EPA-600 624	40	60-120 / 20	Sample container 3 x 40-mL amber glass with septum Preservative HCl to pH<2; 4°C Holding time 14 days
Acetonitrile		820	60-120 / 20	
Benzene		5	60-120 / 20	
1-Butanol		1600	60-120 / 20	
Carbon Disulfide		1500	60-120 / 20	
Carbon tetrachloride		5	60-120 / 20	
Chloroform		5	50-130 / 20	
Methylene chloride		5	50-150 / 20	
Tetrachloroethylene		5	65-140 / 20	
Tetrahydrofuran		100	60-120 / 20	
SEMIVOLATILE ORGANIC COMPOUNDS				
Acetophenone	SW-846 8270 or EPA-600 625	10	70-110 / 25	Sample container 4 x 1-liter amber glass Preservative 4°C Holding time 7 days for extraction; 40 days for analysis after extraction
Carbazole		110	50-120 / 25	
p-Chloroaniline		76	50-120 / 25	
Chrysene		350	50-120 / 25	
Cresol (o, p, m)		760	50-120 / 25	
Di-n-octyl phthalate		300	50-120 / 25	
Diphenylamine		350	50-120 / 25	
Hexachlorobenzene		2	50-120 / 25	
Hexachlorocyclopentadiene		110	50-120 / 25	

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent

Parameter	Analytical Method[1]	Method PQL Sensitivity[2]	Accuracy/ Precision for Method[3] (percent)	Sample container[4]/ Preservative[4]/ Holding time[5]
Isophorone		2600	50-120 / 25	
Lindane (gamma-BHC)		1.9	50-120 / 25	
N-nitrosodimethylamine		12	50-120 / 25	
Pyridine		15	50-120 / 25	
Tributyl phosphate		76	50-120 / 25	
2.4.6-Trichlorophenol		230	50-120 / 25	
POLYCHLORINATED BIPHENYLs (PCBs)				
Aroclor-1016	SW-846 8082	0.4	50-110 / 25	Sample container 4 x 1-liter amber glass Preservative 4°C Holding time 1 year for extraction; 1 year for analysis after extraction
Aroclor-1221		0.4	50-110 / 25	
Aroclor-1232		0.4	50-110 / 25	
Aroclor-1242		0.4	50-110 / 25	
Aroclor-1248		0.4	50-110 / 25	
Aroclor-1254		0.4	50-110 / 25	
Aroclor-1260		0.4	50-110 / 25	
TOTAL METALS				
Arsenic	EPA-600 200.8	11	70-130 / 20	Sample container 1 x 0.5-liter plastic/glass Preservative 1:1 HNO_3 to pH<2 Holding time 180 days; mercury 28 days
Beryllium		34	75 - 125 / 20	
Cadmium		5	70-130 / 20	
Chromium		20	70-130 / 20	
Copper		70	70-130 / 20	
Lead		10	70-130 / 20	

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent

Parameter	Analytical Method[1]	Method PQL Sensitivity[2]	Accuracy/ Precision for Method[3] (percent)	Sample container[4]/ Preservative[4]/ Holding time[5]
Selenium		20	70-130 / 20	
Barium	SW-846 6010/ EPA-600 200.7	1200	75 - 125 / 20	
Calcium		200	75 - 125 / 20	
Iron		100	75 - 125 / 20	
Magnesium		400	75 - 125 / 20	
Nickel		340	75 - 125 / 20	
Potassium		10,000	75 - 125 / 20	
Silicon		580	75 - 125 / 20	
Silver		83	75 - 125 / 20	
Sodium		2500	75 - 125 / 20	
Vanadium		120	75 - 125 / 20	
Zinc		5100	75 - 125 / 20	
Mercury	SW-846 7470, or EPA-600 245 .1	2	70-130 / 20	
GENERAL CHEMISTRY				
Chloride	EPA-600 300.0	1000	70-130 / 20	Sample container 1 x 60-mL plastic/glass Preservative 4°C Holding time 28 days; nitrate and nitrite 48 hours
Fluoride		880	70-130 / 20	
Formate		1250	70-130	
Nitrate (as N)		100	70-130 / 20	
Nitrite (as N)		100	70-130 / 20	
Phosphate		1500	70-130 / 20	
Sulfate		10,000	70-130 / 20	
Ammonia (as N)	EPA-600, 300.7, or EPA-600 350 .1	40	70-130 / 20	Sample container 1 x 50-mL glass or plastic Preservative H_2SO_4 to pH<2; 4°C Holding time 28 days

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent

Parameter	Analytical Method[1]	Method PQL Sensitivity[2]	Accuracy/ Precision for Method[3] (percent)	Sample container[4]/ Preservative[4]/ Holding time[5]
Cyanide	EPA-600 335.2/335.3	350	70-130 / 20	Sample container 1 x 250-mL glass or plastic Preservative NaOH to pH>12; 4°C Holding time 14 days
Alkalinity	EPA-600 310.1/310.2	ND	ND	Sample container 1 x 50-mL glass or plastic Preservative 4°C Holding time 14 days
Total dissolved solids	EPA-600 160.1 or SM2540C	ND	ND	Sample container 1 x 500-mL glass or plastic Preservative 4°C Holding time 7 days
Total suspended solids	EPA-600 160.2 or SM2540D	ND	ND	Sample container 1 x 1-L glass or plastic Preservative 4°C Holding time 7 days
Specific conductivity	EPA-600 120.1 (in lab) or SM2510B	ND	ND	Sample container 1 x 50-mL glass or plastic Preservative 4°C Holding time 28 days

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent

Parameter	Analytical Method[1]	Method PQL Sensitivity[2]	Accuracy/ Precision for Method[3] (percent)	Sample container[4]/ Preservative[4]/ Holding time[5]
pH[7]	EPA-600 150.1 or SM4500-H^+B	ND	ND	Sample container 1 x 60-mL glass or plastic Preservative None Holding time Analyze immediately
Total organic carbon	SW-846 9060 or SMC5310	ND	ND	Sample container 1 x 250-mL amber glass Preservative H_2SO_4 to pH<2; 4°C Holding time 28 days

[1]SW-846 or EPA-600 methods are presented unless otherwise noted. Other methods might be substituted if the applicable PQL can be met.

[2] ST00045000 required method PQL or Delisting Exclusion condition 2 report sensitivity/detection level, whichever is lower. Units are parts per billion unless otherwise noted.

[3]Accuracy/precision used to confirm or re-establish MDL

[4]Sample bottle, volumes, and preservatives could be adjusted, as applicable, for safety reasons

[5]Holding time = time between sampling and analysis

[7]pH monitored in influent aqueous waste only

0°C = Celsius = 32°Fahrenheit
L = liter = 0.26 gallons
mL = milliliter = 0.03 ounces
NA = not applicable
ND = not determined
MDL = method detection level
PQL = practical quantitation limit
RL = reporting limit

Table B.7. Sample Containers, Preservative Methods, and Holding Times for 200 Area ETF Generated Waste

Parameter	Analytical Method[1]	Method PQL	Accuracy/ Precision for Method (percent)	Sample container[2]/ Preservative[2]/ Holding time[3]
Liquid Matrix				
For methods other than total solids, analyze using the methods and QA/QC in Table B.6. For each method, analyze the target compound list				
Total solids	EPA-600 160.3	ND	ND	Sample container 1 x 500-mL glass or plastic Preservative – 4°C Holding time –7 days
Solid Matrix				
Volatile organic compounds (combined method target compound lists)	SW-846 8260	Refer to Table B.6	Refer to Table B.6	Sample container 1 x 40-mL amber glass with septum Preservative –4°C Holding time –14 days
Semi-volatile organic compounds (method target compound list)	SW-846 8270	Refer to Table B.6	Refer to Table B.6	Sample container 1 x 125-mL amber glass Preservative –4°C Holding time –14 days for extraction; 40 days for analysis after extraction
PCBs (method target compound list)	SW-846 8082	Refer to Table B.6	Refer to Table B.6	Sample container Amber glass – 50 g of sample Preservative –4°C Holding time –1 year for extraction; 1 year for analysis after extraction
RCRA Metals (method target compound list)	EPA-600 200.8	Refer to Table B.6	Refer to Table B.6	Sample container glass or plastic – 10 g of sample Preservative –none, mercury 4°C Holding time –180 days; mercury 28 days
Total Metals (method target compound list)	SW-846 6010	Refer to Table B.6	Refer to Table B.6	
Anions (method target compound list)	EPA-600 300.0	Refer to Table B.6	Refer to Table B.6	Sample container glass or plastic –25 g of sample Preservative –none Holding time –6 months for extraction; 28 days for analysis after extraction, nitrate and nitrite 48 hours for analysis after extraction

Table B.7. Sample Containers, Preservative Methods, and Holding Times for 200 Area ETF Generated Waste				
Parameter	**Analytical Method[1]**	**Method PQL**	**Accuracy/ Precision for Method (percent)**	**Sample container[2]/ Preservative[2]/ Holding time[3]**
Ammonia	EPA-600 300.7	Refer to Table B.6	Refer to Table B.6	Sample container glass or plastic – 25 g of sample Preservative –none Holding time –6 months for extraction; 28 days for analysis after extraction
pH	SW-846 9045	ND	ND	Sample container glass or plastic – 50 g of sample Preservative –none Holding time –none
Toxicity Characteristic Leaching Procedure[4]	SW-846 1311	NA	NA	Sample container Refer to specific method being performed after TCLP – 125 g of sample Preservative –None (after TCLP, preserve extract per method being performed) Holding time –Metals: 180 days for TCLP extraction, mercury 28 days for TCLP extraction SVOA: 14 days for TCLP extraction (after TCLP, refer to specific methods for time for analysis after extraction)

[1]SW 846 or EPA-600 methods are presented unless otherwise noted. Other methods might be substituted if the applicable PQL can be met.
[2]Sample bottle, volumes, and preservatives could be adjusted, as applicable, for safety reasons
[3]Holding time equals time between sampling and analysis
[4]Extraction procedure, as applicable; extract analyzed by referenced methods [WAC 173-303-110(3)(c)]
0°C = Celsius = 32°Fahrenheit
g = grams = 0.0352 ounces
mL = milliliter = 0.03 ounces
NA = not applicable
PQL = practical quantitation limit
ND = not determined
TCLP = toxicity characteristic leaching procedure

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ADDENDUM C
PROCESS INFORMATION

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ADDENDUM C
PROCESS INFORMATION

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C. PROCESS INFORMATION

This addendum provides a detailed discussion of the Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (200 Area ETF) processes and equipment. The LERF and 200 Area ETF comprise an aqueous waste treatment system located in the 200 East Area that provides storage and treatment for a variety of aqueous mixed waste. This aqueous waste includes process condensate from the 242-A Evaporator and other aqueous waste generated from onsite remediation and waste management activities.

The LERF consists of three lined surface impoundments, or basins. Aqueous waste from LERF is pumped to the 200 Area ETF for treatment in a series of process units, or systems, that remove or destroy essentially all of the dangerous waste constituents. The treated effluent is discharged to a State-Approved Land Disposal Site (SALDS) north of the 200 West Area, under the authority of a Washington State Waste Discharge Permit ST0004500 and the Final Delisting 200 Area ETF (40 CFR 261, Appendix IX, Table 2).

Both LERF and 200 Area ETF waste processing operations are controlled in a central Control Room located in the 2025-E building. The 200 Area ETF Control Room is staffed continuously during 200 Area ETF processing operations. Processing operations are defined as when liquid transfers of any sort are occurring to/from/within the LERF and 200 Area ETF or when wastes are being treated at 200 Area ETF[1]. Examples of processing operations include, but are not limited to, when liquid waste are transferred to/from the LERF basins [see section C.1], during active liquid waste treatment/processing at the 200 Area ETF (e.g., liquid waste treatment in tanks and liquid waste movement between primary and secondary treatment train processes and/or other 200 Area ETF tanks [see Section C.2], and liquid waste receipts at the Load-In Station [see Section C.2.1]). Section C.2.5.1 describes the centralized computer system (i.e., monitor and control system or MCS) that is located at the 200 Area ETF Control Room and other locations at the 200 Area ETF. The MCS monitors the performance of the 200 Area ETF operations and records alarms from various equipment as described in this Addendum C and Addendum I, Inspection Requirements. At times when processing operations are not occurring, the 200 Area ETF Control Room is not manned continuously, and alarms are monitored daily as specified in Addendum I.

C.1 Liquid Effluent Retention Facility Process Description

Each of the three LERF basins has an operating capacity of 29.5-million liters (7.8 million gallons). The LERF receives aqueous waste through several inlets including the following:

- A pipeline that connects LERF with the 242-A Evaporator.
- A pipeline from the 200 West Area.
- A pipeline that connects LERF to the Load-In Station (2025-ED).
- A series of sample ports located at each basin.

Figure C.1 presents a general layout of LERF and associated pipelines. Aqueous waste from LERF is pumped to the 200 Area ETF through one of two double-walled fiberglass transfer pipelines. Effluent from the 200 Area ETF also can be transferred back to the LERF through one of these transfer pipelines. These pipelines are equipped with leak detection located in the annulus between the inner and outer pipes. In the event that these leak detectors are not in service, the pipelines are visually inspected during transfers for leakage by opening the secondary containment drain lines located at the 200 Area ETF end of the transfer pipelines.

Each basin is equipped with six available sample risers constructed of 15.2-centimeter (6-inch) perforated pipe. A seventh sample riser in each basin is dedicated to influent aqueous waste receipt piping (except for aqueous waste received from the 242-A Evaporator), and an eighth riser in each basin contains liquid level instrumentation.

[1]*Liquid transfers does not include standard facility operations of liquid recirculation (e.g. for pump seals), sanitary water and cooling water, and outdoor rainwater management activities.*

Each riser extends along the sides of each basin from the top to the bottom of the basin and allows samples to be collected from any depth. Personnel access to these sample ports is from the perimeter area of the basins. A catch basin is provided at the northwest corner of each LERF basin for aboveground piping and manifolds for transfer pumps. Aqueous waste from the 242-A Evaporator is transferred through piping which ties into piping at the catch basins. Under routine operations, a submersible pump is used to transfer aqueous waste from a LERF basin to the 200 Area ETF for processing or for basin-to-basin transfers. This pump is connected to a fixed manifold on one of four available risers.

Each basin consists of a multilayer liner system supported by a concrete anchor wall around the basin perimeter and a soil-bentonite clay underlayment. The multilayer liner system consists of a primary liner in contact with the aqueous waste, a layer of bentonite carpet, a geonet, a geotextile, a gravel layer, and a secondary liner that rests on the bentonite underlayment. Any aqueous waste leakage through the primary liner flows through the geonet and gravel to a leachate collection system. The leachate flows to a sump at the northwest corner of each basin, where the leachate is pumped up the side slope and back into the basin above the primary liner. Each liner is constructed of high-density polyethylene. A floating cover made of very low-density polyethylene is stretched over each basin above the primary liner. These covers serve to keep unwanted material from entering the basins, and to minimize evaporation of the liquid contents.

C.2 200 Area Effluent Treatment Facility Process Description

The 200 Area ETF is designed as a flexible treatment system that provides treatment for contaminants anticipated in process condensate and other onsite aqueous waste. The design influent flow rate into the 200 Area ETF is approximately 570 liters (150 gallons) per minute, with planned outages for activities such as maintenance on the 200 Area ETF systems. Maintenance outages typically are scheduled between treating a batch of aqueous waste, referred to as treatment campaigns. The effluent flow (or volume) is equivalent to the influent flow (or volume).

The 200 Area ETF generally receives aqueous waste directly from the LERF. However, aqueous waste also can be transferred from tanker trucks at the Load-In Station (2025-ED) and from containers (e.g., carboys, drums) directly to building 2025-E. Aqueous waste is treated and stored in 2025-E Process Areas in a series of tank systems, referred to as process units. Within building 2025-E, waste also is managed in containers through treatment and/or storage. Figures C.2 and C.3 provide the relative locations of the process and container storage areas within the 200 Area ETF.

The process units are grouped in either the primary or the secondary treatment train. The primary treatment train provides for the removal or destruction of contaminants. Typically, the secondary treatment train processes the waste by-products from the primary treatment train by reducing the volume of waste. In the secondary treatment train, contaminants are concentrated and dried to a powder. The liquid fraction is routed to the primary treatment train. Figure C.2 provides an overview of the layout of the 2025-E building and the Load-In Station). Figure C.3 presents the Building 2025-E Ground Floor Plan, which includes the relative locations of the individual process units and associated tanks, and the location of the Load-In Station.

The dry powder waste and maintenance and operations waste are containerized and stored or treated in the container storage areas or in collection or treatment areas within the 2025-E Process Area. Secondary containment is discussed in Section C.3.4, for containers and in Section C.4.3 for tank systems (including ancillary equipment) housed within building 2025-E. The trenches and floor of building 2025-E comprise the secondary containment system. The floor includes approximately a 15.2-centimeter (6-inch) rise (berm) along the containing walls of the 2025-E Process Area and 2025-E Container Storage Area. Any spilled or leaked material from within the 2025-E Process Area or 2025-E Container Storage Area is collected into trenches that feed into either Sump Tank 1 or Sump Tank 2. From these sump tanks, the spilled or leaked material (i.e., waste) is fed to either the surge tank and processed in the primary treatment train or the secondary waste receiving tanks and processed in the secondary treatment train. All tank systems outside of building 2025-E are provided with a secondary containment system.

In the following sections, several figures are provided that present general illustrations of the treatment units and the relation to the process.

C.2.1 Load-In Station

The 200 Area ETF receives aqueous waste from LERF or the Load-In Station (2025-ED). The Load-In Station, located due east of the surge tank and outside of the perimeter fence (Figure C.2), was designed and constructed to provide the capability to unload, store, and transfer aqueous waste to the LERF or 200 Area ETF from tanker trucks and other containers (such as drums). The Load-In Station consists of two truck bays equipped with Load-In Station tanks, transfer pumps, filtration system, level instrumentation for tanker trucks, leak detection capabilities for the containment basin and transfer line, and an underground transfer line that connects to lines in the surge tank berm, allowing transfers to either the surge tank or LERF. The Load-In Station is covered with a steel building for weather protection. Tanker trucks and other containers are used to unload aqueous waste at the Load-In Station. To perform unloading, the tanker truck is positioned on a truck pad, a 'load-in' transfer line is connected to the truck, and the tanker contents are pumped into one of the Load-In Station tanks, the surge tank, or directly to the LERF. For container unloading, the container is placed on the truck pad and the container contents are pumped into one of the Load-In Station tanks, the surge tank, or directly to the LERF.

During unloading operations, solids may be removed from the waste by pumping the contents of the tanker truck or container through a filtration system. If solids removal is not needed, the filtration system is not used and the solution is transferred directly to the Load-In Station tanks, surge tank, or to LERF.

Any leaks at the Load-In Station drain to the sump. A leak detector in the sump alarms locally and in the 200 Area ETF Control Room. Alarms are monitored continuously in the 200 Area ETF Control Room during Load-In Station transfers and at least daily at times when waste is not being received at the Load-In Station. Alternatively, leaks can be visually detected.

C.2.2 200 Area Effluent Treatment Facility Operating Configuration

Because the operating configuration of the 200 Area ETF can be adjusted or modified, most aqueous waste streams can be effectively treated to below permitting limits. The operating configuration of the 200 Area ETF depends on the unique chemistry of an aqueous waste stream(s). Before an aqueous waste stream is accepted for treatment, the waste is characterized and evaluated. Information from the characterization is used to adjust the treatment process or change the configuration of the 200 Area ETF process units, as necessary, to optimize the treatment process for a particular aqueous waste stream.

Typically, an aqueous waste is processed first in the primary treatment train, where the 200 Area ETF is configured to process an aqueous waste through the UV/OX unit first, followed by the RO unit. However, under an alternate configuration, an aqueous waste could be processed in the RO unit first. For example, high concentrations of nitrates in an aqueous waste might interfere with the performance of the UV/OX. In this case, the 200 Area ETF could be configured to process the waste in the RO unit before the UV/OX unit.

The flexibility of the 200 Area ETF also allows some aqueous waste to be processed in the secondary treatment train first. For example, for small volume aqueous waste with high concentrations of some anions and metals, the approach could be to first process the waste stream in the secondary treatment train. This approach would prevent premature fouling or scaling of the RO unit. The liquid portion (i.e., untreated overheads from the Evaporator Vapor Body Vessel (60IEV-1) and thin film dryer) would be sent to the primary treatment train.

Figures C.4 and C.5 provide example process flow diagrams for two different operating configurations.

C.2.3 Primary Treatment Train

The primary treatment train consists of the following processes:

- Influent Receipt/Surge tank - inlet, surge capacity.

- Filtration - for suspended solids removal.
- UV/OX - organic destruction.
- pH adjustment - waste neutralization.
- Hydrogen peroxide decomposition - removal of excess hydrogen peroxide.
- Degasification - removal of carbon dioxide.
- RO - removal of dissolved solids.
- IX - removal of dissolved solids.
- Verification - holding tanks during verification.

Influent Receipt/Surge Tank. Depending on the configuration of the 200 Area ETF, the surge tank is one inlet used to feed an aqueous waste into the 200 Area ETF for treatment. In Configuration 1 (Figure C.4), the surge tank is the first component downstream of the LERF. The surge tank provides a storage/surge volume for chemical pretreatment and controls feed flow rates from the LERF to the 200 Area ETF. However, in Configuration 2 (Figure C.5), aqueous waste from LERF is fed directly into the treatment units. In this configuration, the surge tank receives aqueous waste, which has been processed in the RO units, and provides the feed stream to the remaining downstream process units. In yet another configuration, some small volume aqueous waste could be received into the secondary treatment train first for processing. In this case, the aqueous waste would be received directly into the secondary waste receiving tanks. Finally, the surge tank also receives waste extracted from various systems within the primary and secondary treatment train while in operation.

The surge tank is located outside building 2025-E on the south side. In the surge tank (Figure C.6), the pH of an aqueous waste is adjusted using the metered addition of sulfuric acid and sodium hydroxide, as necessary, to prepare the waste for treatment in downstream processes. In addition, hydrogen peroxide or biocides could be added to control biological growth in the surge tank. A pump recirculates the contents in the surge tank, mixing the chemical reagents with the waste to a uniform pH.

Filtration. Two primary filter systems remove suspended particles in an aqueous waste: a rough filter removes the larger particulates, while a fine filter removes the smaller particulates. The location of these filters depends on the configuration of the primary treatment train. However, the filters normally are located upstream of the RO units.

The solids accumulating on these filter elements are backwashed to the secondary waste receiving tanks with pulses of compressed air and water, forcing water back through the filter. The backwash operation is initiated either automatically by a rise in differential pressure across the filter or manually by an operator. The filters are cleaned chemically when the backwashing process does not facilitate acceptable filter performance.

Auxiliary fine and rough filters (e.g., disposable filters) have been installed to provide additional filtration capabilities. Depending on the configuration of the 200 Area ETF, the auxiliary filters are operated either in series with the primary filters to provide additional filtration or in parallel, instead of the primary fine and rough filters, to allow cleaning/maintenance of the primary fine and rough filters while the primary treatment train is in operation.

Ultraviolet Light/Oxidation (UV/OX). Organic compounds contained in an aqueous waste stream are destroyed in the UV/OX system (Figure C.7). Hydrogen peroxide is mixed with the waste. The UV/OX system uses the photochemical reaction of UV light on hydrogen peroxide to form hydroxyl radicals and other reactive species that oxidize the organic compounds. The final products of the complete reaction are carbon dioxide, water, and inorganic ions.

Organic destruction is accomplished in two UV/OX units operating in parallel. During the UV/OX process, the aqueous waste passes through reaction chambers where hydrogen peroxide is added. While in the UV/OX system, the temperature of an aqueous waste is monitored. Heat exchangers are used to reduce the temperature of the waste should the temperature of the waste approach the upper limits for the UV/OX or RO systems.

pH Adjustment. The pH of a waste stream is monitored and controlled at different points throughout the treatment process. Within the primary treatment train, the pH of a waste can be adjusted with sulfuric acid or sodium hydroxide to optimize operation of downstream treatment processes or adjusted before final discharge. For example, the pH of an aqueous waste would be adjusted in the pH adjustment tank after the UV/OX process and before the RO process. In this example, pH is adjusted to cause certain chemical species such as ammonia to form ammonium sulfate, thereby increasing the rejection rate of the RO.

Hydrogen Peroxide Decomposition. Typically, hydrogen peroxide added into the UV/OX system is not consumed completely by the system. Because hydrogen peroxide is a strong oxidizer, the residual hydrogen peroxide from the UV/OX system is removed to protect the downstream equipment. The hydrogen peroxide decomposer uses a catalyst to break down the hydrogen peroxide that is not consumed completely in the process of organic destruction. The aqueous waste is sent through a column that breaks down the hydrogen peroxide into water and oxygen. The gas generated by the decomposition of the hydrogen peroxide is vented to the vessel off gas system.

Degasification. The degasification column is used to purge dissolved carbon dioxide from the aqueous waste to reduce the carbonate loading to downstream dissolved solids removal processes within the 200 Area ETF primary treatment train. The purged carbon dioxide is vented to the vessel off gas system.

Reverse Osmosis (RO). The RO system (Figure C.8) uses pressure to force clean water molecules through semi-permeable membranes while keeping the larger molecule contaminants, such as dissolved solids, and large molecular weight organic materials, in the membrane. The RO process uses a staged configuration to maximize water recovery. The process produces two separate streams, including a clean 'permeate' and a concentrate (or retentate), which are concentrated as much as possible to minimize the amount of secondary waste produced.

The RO process is divided into first and second stages. Aqueous waste is fed to the first RO stage from the RO feed tank. The secondary waste receiving tanks of the secondary treatment train receive the retentate removed from the first RO stage, while the second RO stage receives the permeate (i.e., 'treated' aqueous waste from the first RO stage). In the second RO stage, the retentate is sent to the first stage RO feed tank while the permeate is sent to the IX system or to the surge tank, depending on the configuration of the 200 Area ETF.

Two support systems facilitate this process. An anti-scale system injects scale inhibitors as needed into the feed waste to prevent scale from forming on the membrane surface. A clean-in-place system using cleaning agents, such as descalants and surfactants, cleans the membrane pores of surface and subsurface deposits that have fouled the membranes.

Ion Exchange. Because the RO process removes most of the dissolved solids in an aqueous waste, the IX process (Figure C.9) acts as a polishing unit. The IX system consists of three columns containing beds of cation and/or anion resins. This system is designed to allow for regeneration of resins and maintenance of one column while the other two are in operation. Though the two columns generally are operated in series, the two columns also can be operated in parallel or individually.

Typically, the two columns in operation are arranged in a primary/secondary (lead/lag) configuration, and the third (regenerated) column is maintained in standby.

When dissolved solids breakthrough the first IX column and are detected by a conductivity sensor, this column is removed from service for regeneration, and the second column replaces the first column and the third column is placed into service. The column normally is regenerated using sulfuric acid and sodium hydroxide. The resulting regeneration waste is collected in the secondary waste receiving tanks.

Spent resins are transferred into a disposal container should regeneration of the IX resins become inefficient Free water is removed from the container and returned to the surge tank. Dewatered resins are transferred to a final storage/disposal point.

Verification. The three verification tanks (Figure C.10) are used to hold the treated effluent while a determination is made that the effluent meets discharge limits. The effluent can be returned to the primary treatment train for additional treatment, or to the LERF, should a treated effluent not meet Waste Discharge Permit ST0004500 requirements.

The three verification tanks alternate between three operating modes: receiving treated effluent, holding treated effluent during laboratory analysis and verification, or discharging verified effluent. Treated effluent may also be returned to the 200 Area ETF to provide 'clean' service water for operational and maintenance functions, e.g., for boiler water and for backwashing the filters. This recycling keeps the quantity of fresh water used to a minimum.

C.2.4 Secondary Treatment Train

The secondary treatment system typically receives and processes the following by-products generated from the primary treatment train: concentrate from the first RO stage, filter backwash, regeneration waste from the ion exchange system, and spillage or overflow received into the process sumps. Depending on the operating configuration, however, some aqueous waste could be processed in the secondary treatment train before the primary treatment train (refer to Figures C.4 and C.5 for example operating configurations).

The secondary treatment train provides the following processes:

- Secondary waste receiving - tank receiving and chemical addition.
- Evaporation - concentrates secondary waste streams.
- Concentrate staging - concentrate receipt, pH adjustment, and chemical addition.
- Thin film drying - dewatering of secondary waste streams.
- Container handling - packaging of dewatered secondary waste.

Secondary Waste Receiving. Waste to be processed in the secondary treatment train is received into two secondary waste receiving tanks, where the pH can be adjusted with sulfuric acid or sodium hydroxide for optimum evaporator performance. Chemicals, such as reducing agents, may be added to waste in the secondary waste receiving tanks to reduce the toxicity or mobility of constituents in the powder.

Evaporation. The Evaporator Vapor Body Vessel (60IEV-1) is fed alternately by the two secondary waste receiving tanks. One tank serves as a waste receiver while the other tank is operated as the feed tank. The Evaporator Vapor Body Vessel (also referred to as the vapor body) is the principal component of the evaporation process (Figure C.11).

Feed from the secondary waste receiving tanks is pumped through a heater to the recirculation loop of the 200 Area ETF Evaporator. In this loop, concentrated waste is recirculated from the Evaporator Vapor Body Vessel, to a heater, and back into the evaporator where vaporization occurs. As water leaves the evaporator system in the vapor phase, the concentration of the waste in the evaporator increases. When the concentration of the waste reaches the appropriate density, a portion of the concentrate is pumped to one of the concentrate tanks.

The vapor that is released from the Evaporator Vapor Body Vessel is routed to the entrainment separator, where water droplets and/or particulates are separated from the vapor. The 'cleaned' vapor is routed to the vapor compressor and converted to steam.

The steam from the vapor compressor is sent to the heater (reboiler) and used to heat the recirculating concentrate in the Evaporator Vapor Body Vessel. From the heater, the steam is condensed and fed to the distillate flash tank, where the saturated condensate received from the heater drops to atmospheric pressure and cools to the normal boiling point through partial flashing (rapid vaporization caused by a pressure reduction). The resulting distillate is routed to the surge tank. The non-condensable vapors, such as air, are vented through a vent gas cooler to the vessel off gas system.

Concentrate Staging. The concentrate tanks make up the head end of the thin film drying process. From the Evaporator Vapor Body Vessel, concentrate is pumped into two concentrate tanks, and pH adjusted chemicals, such as reducing agents, may be added to reduce the toxicity or mobility of constituents when converted to powder. Waste is transferred from the concentrate tanks to the thin film dryer for conversion to a powder. The concentrate tanks function alternately between concentrate receiver and feed tank for the thin film dryer. However, one tank may serve as both concentrate receiver and feed tank.

Because low solubility solids (i.e., calcium and magnesium sulfate) tend to settle in the concentrate tanks, these solids must be removed to prevent fouling and to protect the thin film dryer, and to maintain concentrate tank capacity.

Thin Film Drying. From the concentrate tanks, feed is pumped to the thin film dryer (Figure C.12) that is heated by steam. As the concentrated waste flows down the length of the dryer, the waste is dried. The dried film, or powder, is scraped off the dryer cylinder by blades attached to a rotating shaft. The powder is funneled through a cone-shaped powder hopper at the bottom of the dryer and into the Container Handling System.

Overhead vapor released by the drying of the concentrate is condensed in the distillate condenser. Excess heat is removed from the distillate by a water-cooled heat exchanger. Part of the distillate is circulated back to the condenser spray nozzles. The remaining distillate is pumped to the surge tank. Any noncondensable vapors and particulates from the spray condenser are exhausted to the vessel off gas system.

Container Handling. Before an empty container is moved into the Container Handling System (Figure C.13), the lid is removed and the container is placed on a conveyor. The containers are moved into the container filling area after passing through an air lock. The empty container is located under the thin film dryer, and raised into position. The container is sealed to the thin film dryer and a rotary valve begins the transfer of powder to the empty container. Air displaced from the container is vented to the distillate condenser attached to the Evaporator Vapor Body Vessel that exhausts to the vessel off gas system.

The container is filled to a predetermined level, then lowered from the thin film dryer and moved along a conveyor. The filled container is manually recapped, and moved along the conveyor to the airlock. At the airlock, the container is moved onto the conveyor by remote control. The airlock is opened, the smear sample (surface wipe) is taken, and the contamination level counted. A 'C' ring is installed to secure the container lid. If the container has contaminated material on the outside, the container is wiped down and retested. Filled containers that pass the smear test are labeled, placed on pallets, and moved by forklift to the filled container storage area. Section C.3 provides a more detailed discussion of container handling.

C.2.5 Other 200 Area Effluent Treatment Facility Systems

The 200 Area ETF is provided with support systems that facilitate treatment in the primary and secondary treatment trains and that provide for worker safety and environmental protection. An overview of the following systems is provided:

- Monitor and control system
- Vessel off gas system
- Sump collection system
- Chemical injection feed system
- Verification tank recycle system
- Utilities

C.2.5.1 Monitor and Control System

The operation of the 200 Area ETF is monitored and controlled by a centralized computer system (i.e., monitor and control system or MCS). The MCS continuously monitors data from various field indicators, such as pH, flow, tank level, temperature, pressure, conductivity, alarm status, and valve switch positions. Data gathered by the MCS enable operations and engineering personnel to document and adjust the operation of the 200 Area ETF.

Emergency communications equipment and warning systems (e.g. fire alarms and evacuation alarms) are included in Addendum J, Contingency Plan. These emergency response notification alarms are monitored continuously at central Hanford Facility locations (e.g. Hanford Fire Station) and do not rely on staff being present in the 200 Area ETF Control Room for notification and response.

C.2.5.2 Vessel Off Gas System

Ventilation for various tanks and vessels is provided through the vessel off gas system. The system includes a moisture separator, duct heater, pre-filter, high-efficiency particulate air filters, carbon absorber (when required to reduce organic emissions), exhaust fans, and ductwork. Gasses ventilated from the tanks and vessels enter the exhaust system through the connected ductwork. The vessel off gas system draws vapors and gasses off the following tanks and treatment systems:

- Surge tank (60A-TK-1)
- Vent gas cooler (off the Evaporator Vapor Body Vessel (60I-EV-1)/distillate flash tank) (60I-TK-2)
- pH adjustment tank (60C-TK-1)
- Concentrate tanks (2025E-60J-TK-1A/ 2025E-60J-TK-1B)
- Degasification system
- First and second RO stages
- Dry powder hopper
- Effluent pH adjustment tank (60C-TK-2)
- Drum capping station
- Secondary waste receiving tanks (60I-TK-1A /60I-TK-1B)
- Distillate condenser (off the thin film dryer)
- Sump tanks 1 and 2

The vessel off gas system maintains a negative pressure with respect to the atmosphere, which produces a slight vacuum within tanks, vessels, and ancillary equipment for the containment of gas vapor. This system also provides for the collection, monitoring, and treatment of confined airborne in-vessel contaminants to preclude over-pressurization. The high-efficiency particulate air filters remove particulates and condensate from the air stream before these are discharged to the heating, ventilation, and air conditioning system.

C.2.5.3 Sump Collection System

Sump Tanks 1 and 2 compose the sump collection system that provides containment of waste streams and liquid overflow associated with the 200 Area ETF processes. The 2025-E Process Area floor is sloped to two separate trenches that each drain to a sump tank located under the floor of building 2025-E (Figure C.14). One trench runs the length of the primary treatment train and drains to Sump Tank 2, located underneath the verification tank pump floor. The second trench collects spillage primarily from the secondary treatment train and flows to Sump Tank 1, located near the Evaporator Vapor Body Vessel. Sump Tanks 1 and 2 are located below floor level (Figure C.14). An eductor in these tanks prevents sludge from accumulating.

C.2.5.4 Chemical Injection Feed System

At several points within the primary and secondary treatment trains, sulfuric acid and sodium hydroxide (or dilute solutions of these reagents) are metered into specific process units to adjust the pH. For example, a dilute solution of 4 percent sulfuric acid and 4 percent sodium hydroxide could be added to the secondary waste receiving tanks to optimize the evaporation process.

C.2.5.5 Verification Tank Recycle System

To reduce the amount of water added to the process, verification tank water (i.e., verified effluent) is recycled throughout the 200 Area ETF process. Tanks and ancillary equipment that use verification tank water include:

- 4 percent H_2SO4 solution tank and ancillary equipment.
- 4 percent NaOH solution tank and ancillary equipment.
- Clean-in-place tank and ancillary equipment.
- IX columns (during resin regeneration).
- Evaporator Vapor Body Vessel boiler and ancillary equipment.
- Thin film dryer boiler and ancillary equipment.
- Seal water system.

In addition, verification tank water is used extensively during maintenance activities. For example, it may be used to flush piping systems or to confirm the integrity of piping, a process tank, or tank truck.

C.2.5.6 Utilities

The 200 Area ETF maintains the following utility supply systems required for the operation:

- Cooling water system - removes heat from process water via heat exchangers and a cooling tower.
- Compressed air system - provides air to process equipment and instrumentation.
- Seal water system - provides cool, clean, pressurized water to process equipment for pump seal cooling and pump seal lubrication, and provides protection against failure and fluid leakage.
- Demineralized water system - removes solids from raw water system to produce high quality, low ion-content, water for steam boilers, and for the hydrogen peroxide feed system.
- Heating, ventilation, and air conditioning system - provides continuous heating, cooling, and air humidity control throughout building 2025-E.

The following utilities support 200 Area ETF activities:

- Electrical power
- Sanitary water
- Communication systems
- Raw water

C.3 Containers

This section provides specific information on container storage and treatment operations at the 200 Area ETF, including descriptions of containers, labeling, and secondary containment structures.

Per Addendum A, Part A Form the maximum volume of dangerous and/or mixed waste that can be stored in containers is 147,630 liters (39,000 gallons). A list of dangerous and/or mixed waste managed in containers at the 200 Area ETF is also provided in Addendum A, Part A Form. The types of dangerous and/or mixed waste managed in containers in the 200 Area ETF could include:

- Secondary waste powder generated from the treatment process.
- Aqueous waste received from other Hanford site sources awaiting treatment.
- Miscellaneous waste generated by operations and maintenance activities.

The secondary treatment train processes the waste by-products from the primary treatment train, which are concentrated and dried into a powder. Containers are filled with dry powder waste from the thin film dryer via a remotely controlled system. Containers of aqueous waste received from other Hanford site sources are stored at 200 Area ETF until their contents can be transferred to the process for treatment. The waste is usually transferred to the secondary waste receiving or concentration tanks. Containers at the Load-In Station are transferred into one of the Load-In Station tanks, surge tank, or directly to the LERF. Miscellaneous waste generated from maintenance and operations activities are stored at the 2025-E building. The waste could include process waste, such as used filter elements; spent RO membranes; damaged equipment, and decontamination and maintenance waste, such as contaminated rags, gloves, and other personal protective equipment. Containers of miscellaneous waste that have free liquids generally are packaged with absorbents.

Several container collection areas could be located within the 200 Area ETF process and container handling areas. These collection areas are used only to accumulate waste in containers. Once a container is filled, the container is transferred to a container storage area (Figure C.2 and Figure C.3), to another TSD unit, or to a less-than-90-day storage pad. Containers stored in the additional storage area (Figure C.3) are elevated or otherwise protected from contact with accumulated liquids. The 2025-E Container Storage Area is a 22.9 x 8.5-meter (75 x 27.9-foot) room located adjacent to the 2025-E Process Area. Containers are clearly labeled, and access to these containers is limited by barriers and by administrative controls. The 2025-E floor provides secondary containment, and the roof and walls protect all containers from exposure to the elements.

Waste also could be placed in containers for treatment as indicated in Addendum A. For example, sludge that accumulates in the bottoms of the process tanks is removed periodically and placed into containers. In this example, the waste is solidified by decanting the supernatant from the container and the remainder of the waste is allowed to evaporate, or absorbents are added, as necessary, to address remaining liquids. Following treatment, this waste either is stored at the 200 Area ETF or transferred to another treatment, storage, and disposal (TSD) unit.

C.3.1 Description of Containers

The containers used to collect and store dry powder waste are 208-liter (55-gallon) steel containers. Most of the aqueous waste received at 200 Area ETF, and maintenance and operation waste generated, are stored in 208-liter (55-gallon) steel or plastic containers; however, in a few cases, the size of the container could vary to accommodate the size of a particular waste. For example, some process waste, such as spent filters, might not fit into a 208-liter (55-gallon) container. In the case of spent resin from the IX columns, the resin is dewatered, and could be packaged in a special disposal container. In these few cases, specially sized containers could be required. In all cases, however, only approved containers are used and are compatible with the associated waste. Typically, 208-liter (55-gallon) containers are used for treatment.

Current operating practices indicate the use of new 208-liter (55-gallon) containers that have either a polyethylene liner or a protective coating. Any reused or reconditioned container is inspected for container integrity before use. Overpack containers are available for use with damaged containers. Overpack containers typically are unlined steel or polyethylene.

C.3.2 Container Management Practices

Before use, each container is checked for signs of damage such as dents, distortion, corrosion, or scratched coating. For dry powder loading, empty containers on pallets are raised by a forklift and manually placed on the conveyor that transports the containers to the automatic filling station in the container handling room (Figure C.13). The container lids are removed and replaced manually following the filling sequence. After filling, containers exit the container handling room via the filled drum conveyor. Locking rings are installed, the container label is affixed, and the container is moved by dolly or forklift to the 2025-E Container Storage Area.

Before receipt at 200 Area ETF, each container from other Hanford site sources is inspected for leaks, signs of damage, and a loose lid. The identification number on each container is checked to ensure the proper container is received. The containers are typically placed on pallets and moved by dolly or forklift to the container storage area. These containers are later moved to the 2025-E Process Area and the contents transferred to the process for treatment.

Containers used for storing maintenance and operations secondary waste are labeled before being placed in the container storage area or in a collection area. Lids are secured on these containers when not being filled. When the containers in a collection area are full, the containers are transferred by dolly or forklift to the container storage area or to an appropriate TSD unit. Containers used for treating waste also are labeled. The lids on these containers are removed as required to allow for treatment. During treatment, access to these containers is controlled through physical barriers and/or administrative controls.

The filled containers in the container storage areas are inventoried, checked for proper labeling, and placed on pallets or in a separate containment device as necessary. Each pallet is moved by forklift. Within the container storage areas, palletized containers are stacked no more than three pallets high and in rows no more than two containers wide. Unobstructed aisles with a minimum of 76-centimeter (30-inch) aisle space separate rows.

C.3.3 Container Labeling

Labels are affixed on containers used to store dry powder when the containers leave the container handling room. Labels are affixed on other waste containers before use. Every container is labeled with the date that the container was filled. Appropriate major risk labels, such as "corrosive", "toxic", or "F-listed", also are added. Each container also has a label with an identification number for tracking purposes.

C.3.4 Containment Requirements for Managing Containers

Secondary containment is provided in the container management areas within building 2025-E. The secondary containment provided for the tank systems also serves the container management areas. This section describes the design and operation of the secondary containment structure for these areas. Section C.2.1, and Section C.4.3.1.2 discuss secondary containment at the Load-In Station.

C.3.4.1 Container Secondary Containment System Design

For the container management areas, in building 2025-E, secondary containment is provided by the trenches, reinforced concrete floor, and a 15.2-centimeter (6-inch) rise (berm) along the walls of the 2025-E Process Area and 2025-E Container Storage Area. The engineering assessment required for tanks (*Final RCRA Information Needs Report,* Mausshardt 1995) also describes the design and construction of the secondary containment provided for building 2025-E container management areas. All systems were designed to national codes and standards (e.g., American Society for Testing Materials, American Concrete Institute standards). The floor is composed of cast-in-place, pre-formed concrete slabs, and has a minimum thickness of 15.2 centimeters (6-inch). All slab joints and floor and wall joints have water stops installed at the mid-depth of the slab. In addition, filler was applied to each joint. The floor and berms are coated with a chemically resistant; high-solids epoxy coating system consisting of primer and top coating. This coating material is compatible with the waste managed in containers and is an integral part of the secondary containment system for containers.

The floor is sloped to drain any solution in the 2025-E Container Storage Area to floor drains along the west wall. Each floor drain consists of a grating over a 20.3-centimeter (8-inch) diameter drain port connected to a 10.2-centimeter (4-inch) polyvinyl chloride transfer pipe. The pipe passes under this wall and connects to a trench running along the east wall of the adjacent 2025-E Process Area. This trench drains solution to Sump Tank 1.

The 2025-E Container Storage Area is separated from the 2025-E Process Area by a common wall and a door for access to the two areas (Figure C.2). These two areas also share a common floor and trenches that, with the 15.2-centimeter (6-inch) rise of the containing walls, form the secondary containment system for the 2025-E Process Area and the 2025-E Container Storage Area.

C.3.4.2 Structural Integrity of Base

Engineering calculations were performed showing the floor of the 2025-E Container Storage Area is capable of supporting the weight of containers. These calculations were reviewed and certified by a professional engineer (*Final RCRA Information Needs Report,* Mausshardt 1995). The concrete was inspected for damage during construction. Cracks were identified and repaired to the satisfaction of the professional engineer. Documentation of these certifications is included in the engineering assessment (*Final RCRA Information Needs Report,* Mausshardt 1995).

C.3.4.3 Containment System Capacity

The 2025-E Container Storage Area is primarily used to store dry powder, aqueous waste awaiting treatment, and maintenance and operation waste. Where appropriate, absorbents are added to fix any trace liquids present. Large volumes of liquid are not stored in the 2025-E Container Storage Area. However, liquids might be present in those containers that are in the treatment process.

Because they are interconnected by floor drains, both the 2025-E Process Area and the 2025-E Container Storage Area are considered in the containment system capacity. The volume available for secondary containment in the 2025-E Process Area is approximately 68,000 liters (18,000 gallons), as discussed in the engineering assessment (*Final RCRA Information Needs Report*, Mausshardt 1995). Using the dimensions of the 2025-E Container Storage Area (23.6 by 8.5 by 0.15 meters [77 by 28 by 0.5 feet]), and assuming that 50 percent of the floor area is occupied by containers, the volume of the 2025-E Container Storage Area is 15,300 liters (4,040 gallons). The 2025-E Truck Bay loading area (see Figures C.2 and C.3) also provide 10,500 liters (2,700 gallons) of containment as it is connected to the 2025-E Process Area and 2025-E Container Storage Area. The combined volume of the 2025-E Truck Bay loading area, 2025-E Process Area, (including, the Container Handling Room) available for secondary containment, is 93,800 liters (24,810 gallons). This volume is greater than 10 percent of the maximum total volume of containers allowed for storage in the building 2025-E, as discussed previously.

C.3.4.4 Control of Run-on

The container management areas are located within building 2025-E, which serves to prevent run-on of precipitation.

C.3.4.5 Removal of Liquids from Containment Systems

The 2025-E Container Storage Area is equipped with drains that route solution to a trench in the 2025-E Process Area, which drains to Sump Tank 1. The sump tanks are equipped with alarms that notify operating personnel that a leak is occurring. The sump tanks also are equipped with pumps to transfer waste to the surge tank or the secondary treatment train. Additional information on removal of liquids is provided in Section C.2, and Section C.4.3.1.2.

C.3.4.6 Prevention of Ignitable, Reactive, and Incompatible Wastes in Containers

Individual waste types (i.e., ignitable, corrosive, and reactive) are stored in separate containers. A waste that could be incompatible with other wastes is separated and protected from the incompatible waste. Incompatible wastes are evaluated using the methodology documented in 40 CFR 264, Appendix V. For example, acidic and caustic wastes are stored in separate containers. Free liquids are absorbed in miscellaneous waste containers that hold incompatible waste. Additionally, 200 Area ETF-specific packaging requirements for these types of waste provide extra containment with each individual container. For example, each item of acidic waste is individually bagged and sealed within a lined container.

C.4 Tank Systems

This section provides specific information on tank systems and process units. This section also includes a discussion on the types of waste to be managed in the tanks, tank design information, integrity assessments, and additional information on the 200 Area ETF tanks that treat and store dangerous and/or mixed waste. The 200 Area ETF dangerous waste tanks are identified in Section C.4.1.1. Table C.5, *200 Area ETF Tank Systems Information*, Table C.6, *200 Area ETF Additional Tank System Information*, and Table C.7, *Ancillary Equipment and Material Data* provides individual tank volumes, dimensions, and construction materials. The relative locations of the tanks and process units are presented in Figures C.2 and C.3.

C.4.1 Design Requirements

The following sections provide an overview of the design specifications for the tanks within the 200 Area ETF. A separate discussion on the design of the process units also is provided. In accordance with the new tank system requirements of WAC 173-303-640(3), the following tank components and specifications were assessed:

- Dimensions, capacities, wall thicknesses, and pipe connections.
- Materials of construction and linings and compatibility of materials with the waste being processed.
- Materials of construction of foundations and structural supports.
- Review of design codes and standards used in construction.
- Review of structural design calculations, including seismic design basis.
- Waste characteristics and the effects of waste on corrosion.

This assessment was documented in the *Final RCRA Information Needs Report* (*Final RCRA Information Needs Report*, Mausshardt 1995; the engineering assessment performed for the 200 Area ETF tank systems by an independent professional engineer. A similar assessment of design requirements was performed for Load-In Station tanks 59A-TK-109 and 59A-TK-117 and is documented in *200 Area Effluent BAT/AKART Implementation, ETF Truck Load-in Facility, Project W-291H Integrity Assessment Report* (W-291H-IAR, KEH 1995). An assessment was also performed when Load-In Station tank 59A-TK-1 was placed into service for receipt of dangerous and mixed wastes. The assessment is documented in the *200 Area Effluent Treatment Facility Purgewater Unloading Facility Tank System Integrity Assessment* (HNF-41604, 2009).

The specifications for the preparation, design, and construction of the tank systems at the 200 Area ETF are documented in the *Design Construction Specification, Project C-018H, 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility* (V-C018HC1-001, WHC 1992). The preparation, design, and construction of Load-In Station tanks 59A-TK-109 and 59A-TK-117 are provided in the construction specifications in *Project W-291, 200 Area Effluent BAT/AKART Implementation ETF Truck Load-in Facility, Construction Specifications* (*W-291H-C2*, KEH 1994). The preparation, design, and construction of Load-In Station tank 59A-TK-1 are documented in *Purgewater Unloading Facility Project Documentation* (HNF-39966, 2009).

Most of the tanks in the 200 Area ETF are constructed of stainless steel. According to the design of the 200 Area ETF, it was determined stainless steel would provide adequate corrosion protection for these tanks. Exceptions include Load-In Station tank 59A-TK-1, which is constructed of fiberglass-reinforced plastic and the verification tanks, which are constructed of carbon steel with an epoxy coating. The Evaporator Vapor Body Vessel (and the internal surfaces of the thin film dryer) is constructed of a corrosion resistant alloy, known as alloy 625, to address the specific corrosion concerns in the secondary treatment train. Finally, the hydrogen peroxide decomposer vessels are constructed of carbon steel and coated with a vinyl ester lining.

The shell thicknesses of the tanks identified in Table C.5 represent a nominal thickness of a new tank when placed into operation. The tank capacities identified in this table represent the maximum volumes. Nominal tank volumes discussed below represent the maximum volume in a tank unit during normal operations.

C.4.1.1 Codes and Standards for Tank System Construction

Specific standards for the manufacture of tanks and process systems installed in the 200 Area ETF are briefly discussed in the following sections. In addition to these codes and industrial standards, a seismic analysis for each tank and process system is required [WAC 173-303-806(4)(a)(xi)]. The seismic analysis was performed in accordance with UCRL-15910 *Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards*, Section 4 (UCRL 1987). The results of the seismic analyses are summarized in the engineering assessment of the 200 Area ETF tank systems (*Final RCRA Information Needs Report*, Mausshardt 1995).

Storage and Treatment Tanks. The following tanks store and/or treat dangerous waste at the 200 Area ETF.

Tank name	Tank number
Surge tank	2025E-60A-TK-1
pH adjustment tank	2025E-60C-TK-1
Effluent pH adjustment tank	2025E-60C-TK-2
First RO feed tank	2025E-60F-TK-1
Second RO feed tank	2025E-60F-TK-2
Verification tanks (three)	2025E-60H-TK-1A/1B/1C
Secondary waste receiving tanks (two)	2025E-60I-TK-1A/1B
Evaporator Vapor Body Vessel	2025E-60I-EV-1
Concentrate tanks (two)	2025E-60J-TK-1A/2025E-60J-TK-1B
Sump tanks (two)	2025E-20B-TK-1/2
Distillate flash tank	2025E-60I-TK-2
Load-In Station tanks	2025ED-59A-TK-1/109/117

The relative location of these tanks is presented in Figure C.3. These tanks are maintained at or near atmospheric pressure. The codes and standards applicable to the design, construction, and testing of the above tanks and ancillary piping systems are as follows:

ASME - B31.3	Chemical Plant and Petroleum Refinery Piping (ASME 1990)
ASME Sect. VIII, Division I	Pressure Vessels (*Boiler and Pressure Vessel Code,* ASME 1992)
AWS - D1.1	Structural Welding Code - Steel (AWS 1992)
ANSI - B16.5	Pipe Flanges and Flanged Fittings (ANSI 1992)
ASME Sect. IX	Welding and Brazing Qualifications (*Boiler and Pressure Vessel Code,* ASME 1992)
API 620	Design and Construction of Large Welded Low Pressure Storage Tanks (API 1990)
AWWA - D100	Welded Steel Tanks for Water Storage (AWWA 1989)
AWWA - D103	Factory-Coated Bolted Steel Tanks for Water Storage (AWWA 1987)
AWWA - D120	Thermosetting Fiberglass-Reinforced Plastic Tanks (AWWA 1984)
ASTM-D3299	Filament Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion Resistant Tanks.

The application of these standards to the construction of 200 Area ETF tanks and independent verification of completed systems ensured that the tank and tank supports had sufficient structural strength and that seams and connections were adequate to ensure tank integrity. In addition, each tank met strict quality assurance requirements. Each tank, constructed offsite was tested for integrity and leak tightness before shipment to the Hanford Facility. Following installation, the systems were inspected for damage to ensure against leakage and to verify proper operation. If a tank was damaged during shipment or installation, leak tightness testing was repeated onsite.

C.4.1.2 Design Information for Tanks Located Outside of Building 2025-E

The load-In Station tanks, surge tank, and verification tanks are located outside building 2025-E. These tanks are located within concrete structures that provide secondary containment. Table C.5, 200 Area ETF Tank Systems Information, provides individual tank volumes, dimensions, and construction materials for tanks located outside building 2025-E.

Load-In Station Tanks (59A-TK-1/ 59A-TK-109/ 59A-TK-117) and Ancillary Equipment. Load-In Station tanks 59A-TK-109 and 59A-TK-117 are located outside of the Load-In Station building while Load-In Station tank 59A-TK-1 is located inside the Load-In Station building. Load-In Station tanks 59A-TK-109 and 59A-TK-117 are heated. Ancillary equipment includes transfer pumps, filtration systems, a double encased, fiberglass transfer pipeline, level instruments for tanker trucks, and leak detection equipment. From the Load-In Station, aqueous waste can be routed to the surge tank or to the LERF through a double-encased line. Secondary containment for the Load-In Station tanks is discussed in Section C.4.3.1.2.

Surge Tank (60A-TK-1) and Ancillary Equipment. The surge tank is located outside on the south side of building 2025-E. Ancillary equipment to the surge tank includes two underground double encased (i.e., pipe-within-a-pipe) transfer lines connecting to LERF and three pumps for transferring aqueous waste to the primary treatment train. The surge tank is located at the south end of building 2025-E. The surge tank is insulated and the contents heated to prevent freezing. Eductors in the tank provide mixing.

Verification Tanks (60H-TK-1A/ 60H-TK-1B/ 60H-TK-1C) and Ancillary Equipment. The verification tanks are located outside and north of building 2025-E. For support, the tanks have a center post with a webbing of beams that extend from the center post to the sides of the tank. The roof is constructed of epoxy covered carbon steel that is attached to the cross beams of the webbing. The tank floor also is constructed of epoxy covered carbon steel and is sloped. Eductors are installed in each tank to provide mixing.

Ancillary equipment includes a return pump that provides circulation of treated effluent through the eductors. The return pump also recycles effluent back to the 200 Area ETF for retreatment and can provide service water for 200 Area ETF functions. Two transfer pumps are used to discharge treated effluent to SALDS or back to the LERF.

C.4.1.3 Design Information for Tanks Located Inside Building 2025-E

Most of the tanks and ancillary equipment that store or treat dangerous and/or mixed waste are located within building 2025-E. The structure serves as secondary containment for the tank systems. Table C.5, 200 Area ETF Tank Systems Information, provides individual tank volumes, dimensions, and construction materials for tanks located outside building 2025-E.

pH Adjustment Tank (60C-TK-1) and Ancillary Equipment. Ancillary equipment for the pH adjustment tank includes overflow lines to a sump tank and pumps to transfer waste to other units in the main treatment train.

Effluent pH Adjustment Tank (60C-TK-2) and Ancillary Equipment. Ancillary equipment for the effluent pH adjustment tank includes overflow lines to a sump tank and pumps to transfer waste to the verification tanks.

First and Second RO Feed Tanks and Ancillary Equipment. The first RO feed tank is a vertical, stainless steel tank with a round bottom. Conversely, the second RO feed tank is a rectangular vessel with the bottom of the tank sloping sharply to a single outlet in the bottom center. Each RO tank has a pump to transfer waste to the RO arrays. Overflow lines are routed to a sump tank.

Secondary Waste Receiving Tanks (60I-TK-1A/30I-TK-1B) and Ancillary Equipment. Two secondary waste receiving tanks collect waste from the units in the main treatment train, such as concentrate solution (retentate) from the RO units and regeneration solution from the IX columns. These are vertical, cylindrical tanks with a semi-elliptical bottom and a flat top. Ancillary equipment includes overflow lines to a sump tank and pumps to transfer aqueous waste to the Evaporator Vapor Body Vessel.

Evaporator Vapor Body Vessel (2025E-60I-EV-1) and Ancillary Equipment. The Evaporator Vapor Body Vessel, the principal component of the evaporation process, is a cylindrical pressure vessel with a conical bottom. Aqueous waste is fed into the lower portion of the vessel. The top of the vessel is domed and the vapor outlet is configured to prevent carryover of liquid during the foaming or bumping (violent boiling) at the liquid surface.

The Evaporator Vapor Body Vessel includes the following ancillary equipment:

- Preheater
- Recirculation pump
- Waste heater with steam level control tank
- Concentrate transfer pump
- Entrainment separator
- Vapor compressor with silencers
- Silencer drain pump

Distillate Flash Tank (60I-TK-2) and Ancillary Equipment. The distillate flash tank is a horizontal tank. Ancillary equipment includes a pump to transfer the distillate to the surge tank for reprocessing.

Concentrate Tanks (2025E-60J-TK-1A and 2025E-60J-TK-1B) and Ancillary Equipment. Ancillary equipment for the two concentrate tanks includes overflow lines to a sump tank and pumps for recirculation and transfer.

Sump Tanks. Sump Tanks 1 and 2 are located below floor level. Both sump tanks are double-walled, rectangular tanks, placed inside concrete vaults. The sump tanks are located in pits below grade to allow gravity drain of solutions to the tanks. Each sump tank has two vertical pumps for transfer of waste to the secondary waste receiving tanks or to the surge tank for reprocessing.

C.4.1.4 Design Information for 200 Area Effluent Treatment Facility Process Units

As with the 200 Area ETF tanks, process units that treat and/or store dangerous and/or mixed waste are maintained at or near atmospheric pressure. These units were constructed to meet a series of design standards, as discussed in the following sections. Table C.6 presents the materials of construction and the ancillary equipment associated with these process units. All piping systems are designed to withstand the effects of internal pressure, weight, thermal expansion and contraction, and any pulsating flow. The design and integrity of these units are presented in the engineering assessment (*Final RCRA Information Needs Report,* Mausshardt 1995).

Filters. The Load-In Station fine and rough filter vessels (including the influent and auxiliary filters) are designed to comply with the ASME Section VIII, Division I, Pressure Vessels (*Boiler and Pressure Vessel Code,* ASME 1992). The application of these standards to the construction of the 200 Area ETF filter system and independent inspection ensure that the filter and filter supports have sufficient structural strength and that the seams and connections are adequate to ensure the integrity of the filter vessels.

Ultraviolet Oxidation (UV/OX) System. The UV/OX reaction chamber is designed to comply with manufacturers standards.

Degasification System. The codes and standards applicable to the design, fabrication, and testing of the degasification column are identified as follows:

- ASME - B31.3, Chemical Plant and Petroleum Refinery Piping (ASME 1990)
- AWS - D1.1, Structural Welding Code - Steel (AWS 1992)
- ANSI - B16.5, Pipe Flanges and Flanged Fittings (ANSI 1992)

RO System. The pressure vessels in the RO unit are designed to comply with ASME Section VIII, Division I, Pressure Vessels (*Boiler and Pressure Vessel Code,* ASME 1992), and applicable codes and standards.

Ion Exchange (Polishers). The IX columns are designed in accordance with ASME Section VIII, Division I, Pressure Vessels (*Boiler and Pressure Vessel Code,* ASME 1992), and applicable codes and standards. Polisher piping is fabricated of type 304 stainless steel or polyvinyl chloride (PVC) and meets the requirements of ASME B31.3, *Chemical Plant and Petroleum Refinery Piping* (ASME 1990).

Evaporator Vapor Body Vessel. The Evaporator Vapor Body Vessel is designed to meet the requirements of ASME Section VIII, Division I, Pressure Vessels (*Boiler and Pressure Vessel Code,* ASME 1992), and applicable codes and standards. The Evaporator Vapor Body Vessel piping meets the requirements of ASME B31.3, *Chemical Plant and Petroleum Refinery Piping* (ASME 1990).

Thin Film Dryer System. The thin film dryer is designed to meet the requirements of ASME Section VIII, Division I, *Boiler and Pressure Vessel Code* (Pressure Vessels, ASME 1992), and applicable codes and standards. The piping meets the requirements of ASME B31.3, *Chemical Plant and Petroleum Refinery Piping* (ASME 1990).

C.4.1.5 Integrity Assessments

The integrity assessment for 200 Area ETF (*Final RCRA Information Needs Report,* Mausshardt 1995) attests to the adequacy of design and integrity of the tanks and ancillary equipment to ensure that the tanks and ancillary equipment will not collapse, rupture, or fail over the intended life considering intended uses. For the Load-In Station tanks, a similar integrity assessment was performed (*200 Area Effluent BAT/AKART Implementation, ETF Truck Load-In Facility, Project W-291H, Integrity Assessment Report* [W-291H-IAR, KEH 1995], and *200 Area Effluent Treatment Facility Purgewater Unloading Facility Tank System Integrity Assessment* [HNF-41604,2009]). Specifically, the assessment documents the following considerations:

- Adequacy of the standards used during design and construction of the facility.
- Characteristics of the solution in each tank.
- Adequacy of the materials of construction to provide corrosion protection from the solution in each tank.
- Results of the leak tests and visual inspections.

The results of these assessments demonstrate that tanks and ancillary equipment have sufficient structural integrity and are acceptable for storing and treating dangerous and/or mixed waste. The assessments also state that the tanks and building were designed and constructed to withstand a design-basis earthquake. Independent, qualified registered professional engineers certified these tank assessments.

The scope of the 200 Area ETF tank integrity assessment was based on characterization data from process condensate. To assess the effect that other aqueous waste might have on the integrity of the 200 Area ETF tanks, the chemistry of an aqueous waste will be evaluated for its potential to corrode a tank (e.g., chloride concentrations will be evaluated). The tank integrity assessment for the Load-In Station tanks (59A-TK-109/59A-TK-117) was based on characterization data from several aqueous waste streams. The chemistry of an aqueous waste stream not considered in the Load-In Station tank integrity assessment also will be evaluated for the potential to corrode a Load-In Station tank.

Consistent with the recommendations of the integrity assessment, a corrosion inspection program was developed. Periodic integrity assessments are scheduled for those tanks predicted to have the highest potential for corrosion. These inspections are scheduled annually or longer, based on age of the tank system, materials of construction, characteristics of the waste, operating experience, and recommendations of the initial integrity assessment. These 'indicator tanks' include the concentrate tanks, secondary waste receiving tanks, and verification tanks. One of each of these tanks will be inspected yearly to determine if corrosion or coating failure has occurred. Should significant corrosion or coating failure be found, an additional tank of the same type would be inspected during the same year.

In the case of the verification tanks, if corrosion or coating failure is found in the second tank, the third tank also will be inspected. If significant corrosion were observed in all three sets of tanks, the balance of the 200 Area ETF tanks would be considered for inspection. For tanks predicted to have lower potential for corrosion, inspections also are performed nonroutinely as part of the corrective maintenance program.

C.4.2 Additional Requirements for New Tanks

Procedures for proper installation of tanks, tank supports, piping, concrete, etc., are included in *Construction Specification, Project C-018H, 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility* (V-C018HC1-001, WHC 1992). For the Load-In Station tanks (59A-TK-109/ 59A-TK-117), procedures are included in the construction specifications in *Project W-291, 200 Area Effluent BAT/AKART Implementation ETF Truck Load-in Facility, Construction Specifications* (*W-291H-C2*, KEH 1994) and *Purgewater Unloading Facility Project Documentation* (HNF-39966, 2009). Following installation, an independent, qualified, registered professional engineer inspected the tanks and secondary containment. Deficiencies identified included damage to the surge tank, damage to the verification tank liners, and 200 Area ETF secondary containment concrete surface cracking. All deficiencies were repaired to the satisfaction of the engineer. The tanks and ancillary equipment were leak tested as part of acceptance of the system from the construction contractor. Information on the inspections and leak tests are included in the engineering assessment (*Final RCRA Information Needs Report,* Mausshardt 1995). No deficiencies were identified during installation of the Load-In Station tanks and ancillary equipment.

C.4.3 Secondary Containment and Release Detection for Tank Systems

This section describes the design and operation of secondary containment and leak detection systems at the 200 Area ETF.

C.4.3.1 Secondary Containment Requirements for All Tank Systems

The specifications for the preparation, design, and construction of the secondary containment systems at the 200 Area ETF are documented in *Design Construction Specification, Project C-018H, 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility* (V-C018HC1-001, (WHC 1992). The preparation, design, and construction of the secondary containment for the Load-In Station tanks (59A-TK-109/59A-TK-117) are provided in the construction specifications *200 Area Effluent BAT/AKART Implementation ETF Truck Load-In Facility, Construction Specifications,* [*W-291H-C2*, (KEH 1994], and *Purgewater Unloading Facility Project Documentation* [HNF-39966, 2009]). All systems were designed to national codes and standards. Constructing the 200 Area ETF per these specifications ensured that foundations are capable of supporting tank and secondary containment systems and that uneven settling and failures from pressure gradients should not occur.

C.4.3.1.1 Common Elements

The following text describes elements of secondary containment that are common to all 200 Area ETF tank systems. Details on the secondary containment for specific tanks, including leak detection systems and liquids removal, are provided in Section C.4.3.1.2.

Foundation and Construction. For the tanks within the 2025-E building, except for the sump tanks, secondary containment is provided by a coated concrete floor and a 15.2-centimeter (6-inch) rise (berm) along the containing walls. The double-wall construction of the sump tanks provides secondary containment. Additionally, trenches are provided in the floor that also provides containment and drainage of any liquid to a sump pit. For tanks outside building 2025-E, secondary containment also is provided with coated concrete floors in a containment pit (Load-In Station tanks) or surrounded by concrete dikes (the surge tank and verification tanks).

The transfer piping that carries aqueous waste into the 200 Area ETF is pipe-within-a-pipe construction, and is buried approximately 1.2 meters (4 feet) below ground surface. The pipes between the verification tanks and the verification tank pumps within building 2025-E are located in a concrete pipe trench.

For this discussion, there are five discrete secondary containment systems associated with the following tanks and ancillary equipment that treat or store dangerous waste:

- Load-In Station tanks
- Surge tank
- 2025-E Process Area
- Sump Tanks
- Verification tanks
- Transfer piping and pipe trenches

All of the secondary containment systems are designed with reinforcing steel and base and berm thickness to minimize failure caused by pressure gradients, physical contact with the waste, and climatic conditions. Classical theories of structural analysis, soil mechanics, and concrete and structural steel design were used in the design calculations for the foundations and structures. These calculations are maintained at the 200 Area ETF. In each of the analyses, the major design criteria from the following documents were included:

V-C018HC1-001, WHC 1992	*Design Construction Specification, Project C-018H, 242A Evaporator/PUREX Plant Process Condensate Treatment Facility*
DOE Order 6430.1A	General Design Criteria
HPS-SDC-4.1, Revision 11	"Design Load for Structures," *Hanford Plant Standards*
UCRL-15910 LLNL 1987	*Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards*, Lawrence Livermore National Laboratory, Livermore, California
UBC-91 UBC-97	Uniform Building Code, 1991 Edition (ICBO 1991) Uniform Building Code, 1997 Edition (ICC 1997, for Load-In Station tank 59A-TK-1)

The design and structural analysis calculations substantiate the structural designs in the referenced drawings. The conclusions drawn from these calculations indicate that the designs are sound and that the specified structural design criteria were met. This conclusion is verified in the independent design review that was part of the engineering assessment (*Final RCRA Information Needs Report* [Mausshardt 1995]; *200 Area Effluent BAT/AKART Implementation ETF Truck Load-In Facility, Construction Specifications,* [*W-291H-C2,* KEH 1994]; and *200 Area Effluent Treatment Facility Purgewater Unloading Facility Tank System Integrity Assessment* [HNF-41604, 2009]).

Containment Materials. The concrete floor consists of cast-in-place and preformed concrete slabs. All slab joints and floor and wall joints have water stops installed at the mid-depth of the slab. In addition, filler was applied to each joint.

Except for the sump tank vaults, all of the concrete surfaces in the secondary containment system, including berms, trenches, and pits, are coated with a chemical-resistant, high-solids, epoxy coating that consists of a primer and a top coating. This coating material is compatible with the waste being treated, and with the sulfuric acid, sodium hydroxide, and hydrogen peroxide additives to the process. The coating protects the concrete from contact with any chemical materials that might be harmful to concrete and prevents the concrete from being in contact with waste material. Table C.8 summarizes the specific types of primer and top coats specified for the concrete and masonry surfaces in the 200 Area ETF. The epoxy coating is considered integral to the secondary containment system for the tanks and ancillary equipment..

The concrete containment systems are maintained such that any cracks, gaps, holes, and other imperfections are repaired in a timely manner. Thus, the concrete containment systems do not allow spilled liquid to reach soil or groundwater. There are a number of personnel doorways and vehicle access points into the 2025-E Process Area. Releases of any spilled or leaked material to the environment from these access points are prevented by 15.2-centimeter (6-inch) concrete curbs, sloped areas of the floor (e.g., truck ramp), or trenches.

Containment Capacity and Maintenance. Each of these containment areas is designed to contain more than 100 percent of the volume of the largest tank in each respective system. Secondary containment systems for the surge tank, and the verification tanks, which are outside building 2025-E, also are large enough to include the additional volume from a 25-year, 24-hour storm event; i.e., 5.3 centimeters (2 inches) of precipitation.

Sprinkler System. The sprinkler system within the building 2025- E supplies firewater protection to the 2025-E Process Area and the 2025-E Container Storage Area. This system is connected to a site wide water supply system and has the capacity to supply sufficient water to suppress a fire. However, in the event of failure, the sprinkler system can be hooked up to another water source (e.g., tanker truck).

C.4.3.1.2 Specific Containment Systems

The following discussion presents a description of the individual containment systems associated with specific tank systems.

Load-In Station Tank Secondary Containment. The Load-In Station tanks 59A-TK-109 and 59A-TK-117 are mounted on a 46-centimeter (18-inch)-thick reinforced concrete slab (Drawing H-2-817970) outside of the Load-In Station building. Secondary containment is provided by a pit with 30.5-centimeter (12-inch)-thick walls and a floor constructed of reinforced concrete. The Load-In Station tank pit is sloped to drain solution to a sump. The depth of the pit varies with the slope of the floor, with an average thickness of about 1.1 meters (3.5 feet). The volume of the secondary containment is about 73,000 liters (19,300 gallons), which is capable of containing the volume of at least one Load-In Station tank. Leaks are detected by a leak detector that alarms locally, in the 200 Area ETF Control Room, and by visual inspection of the secondary containment. Alarms are monitored continuously in the 200 Area ETF Control Room during Load-In Station transfers and at least daily when there are no Load-In Station transfers occurring.

Adjacent to the pit is a 25.4-centimeter (10-inch)-thick reinforced concrete pad that serves as secondary containment for the Load-In Station tanker trucks, containers, transfer pumps, and filter system that serve as the first tanker truck unloading bay. The pad is inside the Load-In Station building 2025-ED and is 15.2 centimeters (6 inches) below grade with north and south walls gently sloped to allow truck access. The pad has a (7.6-centimeter (3-inch) drain-pipe to route waste solution to the adjacent Load-In Station tank pit. The bay in the Load-In Station building is sloped to channel spills or leaks from containers to the Load-In Station pit. Table C.8 provides additional information on the protective coating for the concrete pad.

Load-In Station tank 59A-TK-1 is located on a 25.4-centimeter (10-inch)-thick reinforced concrete slab (Drawing H-2-817970) inside the Load-In Station building. The tank has a flat bottom that sits on a concrete slab in the secondary containment. Secondary containment for the tank, filter system, and unloading pumps and piping is provided by an epoxy coated catch basin with a capacity of about 3,400 liters (900 gallons). The catch basin is sloped to route leaks and spills from the catch basin through a 15.2-centimeter (6-inch)-wide by 22.9-centimeter (9-inch)-deep trench to the adjacent truck unloading pad. This pad drains to the Load-In Station pit discussed above. The volume of the combined secondary containment of these two systems is greater than 76,400 liters, which is capable of holding the volume of tank 59A-TK-1.

Adjacent to tank 59A-TK-1 catch basin is a 25.4-centimeter (10-inch)-thick reinforced concrete pad that serves as the second tanker truck unloading bay. The pad is inside the metal Load-In Station building and has a 2.4 by 4-meter (8 by 13-feet) shallow, sloping pit to catch leaks during tanker truck unloading. The pit has a maximum depth of 6 centimeters and a 15.2-centimeter (6-inch)-wide by 6-centimeter (2.4-inch)-deep trench to route leaks to the adjacent tank 59A-TK-1 catch basin. The bay in the Load-In Station building is sloped to channel spills or leaks from containers to the Load-In Station pit. Coated concrete surfaces are provided for storage and unloading locations where spills and leaks could potentially occur.

Surge Tank Secondary Containment. The surge tank is mounted on a reinforced concrete ringwall. Inside the ringwall, the flat-bottomed tank is supported by a bed of compacted sand and gravel with a high-density polyethylene liner bonded to the ringwall. The liner prevents galvanic corrosion between the soil and the tank. The secondary containment is reinforced concrete with a 15.2-centimeter (6-inch) thick floor and a 20.3-centimeter (8-inch) thick dike. The secondary containment area shares part of the southern wall of the main 2025-E Process Area. The dike is 2.9 meters (9.5 feet) tall and provides 856,298 liters (226,210 gallons) of secondary containment.

The floor of the secondary containment slopes to a sump in the northwest corner of the containment area. Leaks into the secondary containment are detected by level instrumentation in the sump, which alarms in the 200 Area ETF Control Room and/or by routine visual inspections. Sump alarms are monitored continuously in the 200 Area ETF Control Room during 200 Area ETF processing operations and at least daily when 200 Area ETF is not processing waste. A sump pump is used to transfer solution in the secondary containment to a sump tank.

2025-E Process Area Secondary Containment. The 2025-E Process Area contains the tanks and ancillary equipment of the primary and secondary treatment trains, and has a jointed, reinforced concrete slab floor. The concrete floor of the 2025-E Process Area and sump tanks provide the secondary containment. This floor is a minimum of 15.2 centimeters (6 inches) thick. With doorsills 15.2 centimeter (6 inches) high, the 2025-E Process Area (including the 2025-E Truck Bay loading area and 2025-E Container Storage Area) has a containment volume of approximately 93,800 liters (24,810 gallons) (see Section C.3.4.3).

The floor of the 2025-E Process Area is sloped to drain liquids to two trenches that drain to sumps. Each trench is approximately 38.1 centimeters (15 inches) wide with a sloped trough varying from 39.4 to 76.2 centimeters (15.5 to 30 inches) deep. Leaks into the secondary containment are detected by routine visual inspections of the floor area near the tanks, ancillary equipment, and in the trenches.

A small dam was placed in the trench that comes from the thin film dryer room to contain minor liquid spills originating in the dryer room to minimize the spread of contamination into the 2025-E Process Area. The dryer room is inspected for leaks in accordance with the inspection schedule in Addendum I, Inspection Requirements. Operators clean up these minor spills by removing the liquid waste and decontaminating the spill area.

A small dam was also placed in the trench adjacent to the chemical feed skid when the chemical berm area was expanded to accommodate acid and caustic pumps, which were moved indoors from the top of the surge tank to resolve a safety concern. This dam was designed to contain minor spills originating in the chemical berm area and prevent them from entering the process sump.

The northwest corner of the 2025-E Process Area consists of a pump pit containing the pumps and piping for transferring treated effluent from the verification tanks to SALDS. The pit is built 1.37 meters (4.5 feet) below the 2025-E Process Area floor level and is sloped to drain to a trench built along its north wall that routes liquid to Sump Tank 2. Leaks into the secondary containment of the pump pit are detected by routine visual inspections.

Sump Tanks. The sump tanks support the secondary containment system, and collect waste from several sources, including:

- 2025-E Process Area drain trenches.
- Tank overflows and drains.
- Container washing water.
- Resin dewatering solution.
- Steam boiler blow down.
- Sampler system drains.

These double-contained tanks are located within unlined, concrete vaults. The sump tank levels are monitored by remote level indicators or through visual inspections from the sump covers. These indicators are connected to high- and low-level alarms that are monitored in the 200 Area ETF Control Room during ETF processing operations and at least daily when 200 Area ETF is not processing liquid waste. When a high-level alarm is activated, a pump is activated and the sump tank contents usually are routed to the secondary treatment train for processing. The contents also could be routed to the surge tank for treatment in the primary treatment train. In the event of an abnormally high inflow rate, a second sump pump is initiated automatically.

Verification Tanks Secondary Containment. The three verification tanks (60H-TK-1A /60H-TK-1B/ 60H-TK-1C) are each mounted on ringwalls with high-density polyethylene liners similar to the surge tank. The secondary containment for the three tanks is reinforced concrete with a 15.2-centimeter (6-inch) thick floor and a 20.3-centimeter (8-inch) thick dike. The dike extends up 2.4 meters (8 feet) to provide a containment of approximately 3,390,000 liters (896,000 gallons) exceeding the capacity of a single verification tank (See Table C.5).

The floor of the secondary containment slopes to a sump along the southern wall of the dike. Leaks into the secondary containment are detected by level instrumentation in the sump and/or by routine visual inspections. Sump alarms are monitored continuously in the 200 Area ETF Control Room during 200 Area ETF processing operations and at least daily when 200 Area ETF is not processing waste. A sump pump is used to transfer solution in the secondary containment to a sump tank.

C.4.3.2 Additional Requirements for Specific Types of Systems

This section addresses additional requirements in WAC 173-303-640 for double-walled tanks like the sump tanks and secondary containment for ancillary equipment and piping associated with the tank systems.

C.4.3.2.1 Double-Walled Tanks

The sump tanks are the only tanks in the 200 Area ETF classified as 'double-walled' tanks. These tanks are located in unlined concrete vaults and support the secondary containment system for the 2025-E Process Area. The sump tanks are equipped with a leak detector between the walls of the tanks that provide continuous monitoring for leaks. The leak detector alarms are monitored in the 200 Area ETF Control Room. These sump tank alarms are monitored continuously during 200 Area ETF processing operations and at least daily when 200 Area ETF is not processing waste. The inner tanks are contained completely within the outer shells. The tanks are contained completely within the concrete structure of building 2025-E so corrosion protection from external galvanic corrosion is not necessary.

C.4.3.2.2 Ancillary Equipment

The secondary containment provided for the tanks and process systems also serves as secondary containment for the ancillary equipment associated with these systems.

Ancillary Equipment. Section C.4.3.1.2 describes the secondary containment systems that also serve most of the ancillary equipment within the 200 Area ETF. Between building 2025-E and the verification tanks, a pipeline trench provides secondary containment for four pipelines connecting the transfer pumps (i.e., discharge and return pumps) in the 200 Area ETF with the verification tanks (Figure C.2, Table C.6, and Table C.7). This concrete trench crosses under the road and extends from the verification tank pumps to the verification tanks. Treated effluent flows through these pipelines from the verification tank pumps to the verification tanks. The return pump is used to return effluent to the 200 Area ETF for use as service water or for reprocessing.

For all of the ancillary equipment housed within building 2025-E, the concrete floor, trenches, and berms form the secondary containment system. For the ancillary equipment of the surge tank and the verification tanks, secondary containment is provided by the concrete floors and dikes associated with these tanks. The concrete floor and pit provide secondary containment for the ancillary equipment of the Load-In Station tanks.

Transfer Piping and Pipe Trenches. The two buried transfer lines between LERF and the surge tank have secondary containment in a pipe-within-a-pipe arrangement. The 10.2-centimeter (4-inch) transfer line has a 20.3-centimeter (8-inch) outer pipe, while the 7.6-centimeter (3-inch) transfer, line has a 15.2-centimeter (6-inch) outer pipe. The pipes are fiberglass and are sloped towards the surge tank. The outer piping ends with a drain valve in the surge tank secondary containment.

These pipelines are equipped with leak detection located in the annulus between the inner and outer pipes; the leak detection equipment can continuously 'inspect' the pipelines during aqueous waste transfers. The alarms on the leak detection system are monitored in the 200 Area ETF Control Room. The 200 Area Control Room alarms are monitored continuously during aqueous waste transfers between LERF and the 200 Area ETF surge tank, and at least daily when no transfers are occurring. A low-volume air purge of the annulus is provided to prevent condensation buildup and minimize false alarms by the leak detection system. In the event that these leak detectors are not in service, the pipelines are inspected during transfers by opening a drain valve to check for solution in the annular space between the inner and outer pipe.

The 7.6-centimeter (3-inch) transfer line between the Load-In Station tanks and the surge tank has a 15.2 centimeter (6-inch) outer pipe in a pipe-within-a-pipe arrangement. The piping is made of fiberglass-reinforced plastic and slopes towards the Load-In Station tank secondary containment pit. The drain valve and leak detection system for the Load-In Station tank pipelines are operated similarly to the leak detection system for the LERF to 200 Area ETF pipelines.

As previously indicated, a reinforced concrete pipe trench provides secondary containment for piping under the roadway between the 200 Area ETF and the verification tanks (60H-TK-1A/60H-TK-1B/ 60H-TK-1C). Three 15.2 centimeter (6-inch) thick reinforced concrete partitions divide the trench into four portions and support metal gratings over the trench. Each portion of the trench is 1.2 meters (4 feet) wide, 0.76 meter (2.5 feet) deep, and slopes to route any solution present to 10.2-centimeter (4-inch) drain lines through the north wall of building 2025-E. These drain lines route solution to Sump Tank 2 in building 2025-E. The floor of the pipe trench is 30.5 centimeters (12 inches) thick and the sides are 15.2 centimeters (6 inches) thick. The concrete trenches are coated with water sealant and covered with metal gratings at ground level to allow vehicle traffic on the roadway.

C.4.4 Tank Management Practices

When an aqueous waste stream is identified for treatment or storage at 200 Area ETF, the generating unit is required to characterize the waste. Based on characterization data, the waste stream is evaluated to determine if the stream is acceptable for treatment or storage. Specific tank management practices are discussed in the following sections.

C.4.4.1.1 Rupture, Leakage, Corrosion Prevention

Most aqueous waste streams can be managed such that corrosion would not be a concern. For example, an aqueous waste stream with high concentrations of chloride might cause corrosion problems when concentrated in the secondary treatment train. One approach is to adjust the corrosion control measures in the secondary treatment train. An alternative might be to blend this aqueous waste in a LERF basin with another aqueous waste that has sufficient dissolved solids, such that the concentration of the chlorides in the secondary treatment train would not pose a corrosion concern.

Additionally, the materials of construction used in the tanks systems (Table C.5) make it unlikely that an aqueous waste would corrode a tank. For more information on corrosion prevention, refer to Addendum B, Waste Analysis Plan.

If operating experience suggests that most aqueous waste streams can be managed such that corrosion would not be a concern, operating practices and integrity assessment schedules and requirements will be reviewed and modified as appropriate.

When a leak in a tank system is discovered, the leak is immediately contained or stopped by isolating the leaking component. Following containment, the requirements of WAC 173-303-640(7), incorporated by reference, are followed. These requirements include repair or closure of the tank/tank system component, and certification of any major repairs.

C.4.4.2 Overfilling Prevention

Operating practices and administrative controls used at the 200 Area ETF to prevent overfilling a tank are discussed in the following paragraphs. The 200 Area ETF process is controlled by the MCS. The MCS monitors liquid levels in the 200 Area ETF tanks and has alarms that annunciate on high-liquid level to notify operators that actions must be taken to prevent overfilling of these vessels. As an additional precaution to prevent spills, many tanks are equipped with overflow lines that route solutions to Sump Tanks 1 and 2 to prevent the tank from overflowing into the secondary containment. These tanks include the pH adjustment tank; RO feed tanks, effluent pH adjustment tank, secondary waste receiving tanks, and concentrate tanks.

The following section discusses feed systems, safety cutoff devices, bypass systems, and pressure controls for specific tanks and process systems.

Tanks. All tanks are equipped with liquid level sensors that give a reading of the tank liquid volume. All of the tanks are equipped further with liquid level alarms that are actuated if the liquid volume is near the tank overflow capacity. In the actuation of the surge tank alarm, a liquid level switch trips, sending a signal to the valve actuator on the tank influent lines, and causing the influent valves to close. To prevent tank overflows when liquid level monitors are out of service, the tank system is placed in a safe configuration by isolating the tank from influent flow until the liquid level monitoring is restored to service or daily sump level readings may be taken for tanks that overflow to Sump Tanks 1 and 2.

The operating mode for each verification tank, i.e., receiving, holding, or discharging, can be designated through the MCS; modes also switch automatically. When the high-level set point on the receiving verification tank is reached, the flow to this tank is diverted and another tank becomes the receiver. The full tank is switched into verification mode. The third tank is reserved for discharge mode.

The liquid levels in the pH adjustment, first and second RO feed, and effluent pH adjustment tanks are maintained within predetermined operating ranges. Should any of the tanks overflow, the excess waste is piped along with any leakage from the feed pumps to a sump tank.

When waste in a secondary waste-receiving tank reaches the high-level set point, the influent flow of waste is redirected to the second tank. In a similar fashion, the concentrate tanks switch receipt modes when the high-level set point of one tank is reached.

Filter Systems. All filters at 200 Area ETF (i.e., the Load-In Station, rough, fine, and auxiliary filter systems) are in leak-tight steel casings. For the rough and fine filters, a high differential pressure, which could damage the filter element, activates a valve that shuts off liquid flow to protect the filter element from possible damage. To prevent a high-pressure situation, the filters are cleaned routinely with pulses of compressed air that force water back through the filter. Cleaning is terminated automatically by shutting off the compressed air supply if high pressure develops. The differential pressure across the auxiliary filters also is monitored. A high differential pressure in these filters would result in a system shutdown to allow the filters to be changed out.

The Load-In Station filtration system has pressure gauges for monitoring the differential pressure across each filter. A high differential pressure would result in discontinuing filter operation until the filter is replaced.

Ultraviolet Light/Oxidation System and Decomposers. A rupture disk on the inlet piping to each of the UV/OX reaction vessels relieves to the pH adjustment tank in the event of excessive pressure developing in the piping system. Should the rupture disk fail, the aqueous waste would trip the moisture sensor, shut down the UV lamps, and close the surge tank feed valve. Also provided is a level sensor to protect UV lamps against the risk of exposure to air. Should those sensors be actuated, the UV lamps would be shut down immediately.

The piping and valving for the hydrogen peroxide decomposers are configured to split the waste flow: half flows to one decomposer and half flows to the other decomposer. Alternatively, the total flow of waste can be treated in one decomposer or both decomposers can be bypassed. A safety relief valve on each decomposer vessel can relieve excess system pressure to a sump tank.

Degasification System. The degasification column is typically supplied aqueous waste feed by the pH adjustment tank feed pump. This pump transfers waste solution through the hydrogen peroxide decomposer, the fine filter, and the degasification column to the first RO feed tank.

The degasification column is designed for operation at a partial vacuum. A pressure sensor in the outlet of the column detects the column pressure. The vacuum in the degasification column is maintained by a blower connected to the vessel off gas system. The column is protected from extremely low pressure developed by the column blower by the use of an intake vent that is maintained in the open position during operation. The column liquid level is regulated by a flow control system with a high- and low-level alarm. Plate-type heat exchanger cools the waste solution fed to the degasification column.

RO System. The flow through the first and second RO stages is controlled to maintain constant liquid levels in the first and second stage RO feed tanks.

Polisher. Typically, two of the three columns are in operation (lead/lag) and the third (regenerated) column is in standby. When the capacity of the resin in the first column is exceeded, as detected by an increase in the conductivity of the column effluent, the third column, containing freshly regenerated IX resin, is brought online. The first column is taken offline, and the waste is rerouted to the second column, and to the third. Liquid level instrumentation and automatically operated valves are provided in the IX system to prevent overfilling.

Evaporator Vapor Body Vessel. Liquid level instrumentation in the secondary waste receiving tanks is designed to preclude a tank overflow. A liquid level switch actuated by a high-tank liquid level causes the valves to reposition, closing off flow to the secondary waste receiving tanks. Secondary containment for these tanks routes liquids to a sump tank.

Valves in the Evaporator Vapor Body Vessel feed line can be positioned to bypass the secondary waste around the Evaporator Vapor Body Vessel and to transfer the secondary waste to the concentrate tanks (2025E-60J-TK-1A/2025E-60J-TK-1B).

Thin Film Dryer. The two concentrate tanks alternately feed the thin film dryer. Typically, one tank serves as a concentrate waste receiver while the other tank serves as the dryer feed tank. One tank may serve as both concentrate waste receiver and dryer feed tank. Liquid level instrumentation prevents tank overflow by diverting the concentrate flow from the full concentrate tank to the other concentrate tank. Secondary containment for these tanks routes liquids to a sump tank.

An alternate route is provided from the concentrate receiver tank to the secondary waste receiving tanks. Dilute concentrate in the concentrate receiver tank can be reprocessed through the Evaporator Vapor Body Vessel by transferring the concentrate back to a secondary waste-receiving tank.

C.4.5 Labels or Signs

Each tank or process unit in the 200 Area ETF is identified by a nameplate attached in a readily visible location. Included on the nameplate are the equipment number and the equipment title. Those tanks that store or treat dangerous waste at the 200 Area ETF (Section C.4.1.1) are identified with a label, which reads *PROCESS WATER/WASTE.* The labels are legible at a distance of at least fifty feet or as appropriate for legibility within the 200 Area ETF. Additionally, these tanks bear a legend that identifies the waste in a manner, which adequately warns employees, emergency personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s).

Caution plates are used to show possible hazards and warn that precautions are necessary. Caution signs have a yellow background and black panel with yellow letters and bear the word *CAUTION.* Danger signs show immediate danger and signify that special precautions are necessary. These signs are red, black, and white and bear the word *DANGER.*

Tanks and vessels containing corrosive chemicals are posted with black and white signs bearing the word *CORROSIVE. DANGER - UNAUTHORIZED PERSONNEL KEEP OUT* signs are posted on all exterior doors of building 2025-E, and on each interior door leading into the 2025-E Process Area. Tank ancillary piping is also labeled *PROCESS WATER* or *PROCESS LIQUID* to alert personnel which pipes in the 2025-E Process Area contains dangerous and/or mixed waste.

All tank systems holding dangerous waste are marked with labels or signs to identify the waste contained in the tanks. The labels or signs are legible at a distance of at least 15-meters (50-feet) and bear a legend that identifies the waste in a manner that adequately warns employees, emergency response personnel, and the public, of the major risk(s) associated with the waste being stored or treated in the tank system(s).

C.4.6 Air Emissions

Tank systems that contain extremely hazardous waste that is acutely toxic by inhalation must be designed to prevent the escape of such vapors. To date, no extremely hazardous waste has been managed in 200 Area ETF tanks and is not anticipated. However, the 200 Area ETF tanks have forced ventilation that draws air from the tank vapor spaces to prevent exposure of operating personnel to any toxic vapors that might be present. The vapor passes through a charcoal filter and two sets of high-efficiency particulate air filters before discharge to the environment. The Load-In Station tanks and verification tanks are vented to the atmosphere.

C.4.7 Management of Ignitable or Reactive Wastes in Tanks Systems

Although the 200 Area ETF is permitted to accept waste that is designated ignitable or reactive, such waste would be treated or blended immediately after placement in the tank system so that the resulting waste mixture is no longer ignitable or reactive. Aqueous waste received does not meet the definition of a combustible or flammable liquid given in National Fire Protection Association (NFPA) code number 30 (NFPA 1996).

The buffer zone requirements in NFPA-30, which require tanks containing combustible or flammable solutions be a safe distance from each other and from public way, are not applicable.

C.4.8 Management of Incompatible Wastes in Tanks Systems

The 200 Area ETF manages dilute solutions that can be mixed without compatibility issues. The 200 Area ETF is equipped with several systems that can adjust the pH of the waste for treatment activities. Sulfuric acid and sodium hydroxide are added to the process through the MCS for pH adjustment to ensure there will be no large pH fluctuations and adverse reactions in the tank systems.

C.5 Surface Impoundments

This section provides specific information on surface impoundment operations at the LERF, including descriptions of the liners and secondary containment structures, as required by WAC 173-303-650 and WAC 173-303-806(4)(d).

The LERF consists of three lined surface impoundments (basins) with a design capacity of 29.5 million liters (7.8 million gallons) each. Each basin would overflow when the basin's volume reaches 34 million liters (9 million gallons). The dimensions of each basin at the anchor wall are approximately 103 by 85 meters (338 by 278 feet). The typical top dimensions of the wetted area are approximately 89 by 71 meters (292 by 233 feet), while the bottom dimensions are approximately 57 by 38 meters (188 by 124 feet). Total depth from the top of the dike to the bottom of the basin is approximately 8 meters (26.4 feet) at the deepest point. The typical finished basin bottoms lie at about 4.5 meters (15 feet) below the initial grade and 181 meters (593 feet) above sea level. The dikes separating the basins have a typical height of 3 meters (10 feet) and typical top width of 11.6 meters (38 feet) around the perimeter of the impoundments.

C.5.1 List of Dangerous Waste

A list of dangerous and/or mixed aqueous waste that can be stored in LERF is presented in Addendum A. Addendum B, Waste Analysis Plan also provides a discussion of the types of waste that are managed in the LERF.

C.5.2 Construction, Operation, and Maintenance of Liner System

General information concerning the liner system is presented in the following sections. Information regarding loads on the liner, liner coverage, UV light exposure prevention, and location relative to the water table are discussed.

C.5.2.1 Liner Construction Materials

The LERF employs a double-composite liner system with a leachate detection, collection, and removal system between the primary and secondary liners. Each basin is constructed with an upper or primary liner consisting of a high-density polyethylene geomembrane laid over a bentonite carpet liner. The lower or secondary liner in each basin is a composite of a geomembrane laid over a layer of soil/bentonite admixture with a hydraulic conductivity less than 1.0E-07 centimeters (3.9E-08 inches) per second. The synthetic liners extend up the dike wall to a concrete anchor wall that surrounds the basin at the top of the dike. A batten system bolts the layers in place to the anchor wall (Figure C.15).

Figure C.16 is a schematic cross-section of the liner system. The liner components, listed from the top to the bottom of the liner system, are the following:

- Primary 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene geomembrane
- Bentonite carpet liner
- Geotextile
- Drainage gravel (bottom) and geonet (sides)
- Geotextile
- Secondary 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene geomembrane
- Soil/bentonite admixture (91 centimeters [36 inches] on the bottom, 107 centimeters [42 inches] on the sides)
- Geotextile

The primary geomembrane, made of 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene, forms the basin surface that holds the aqueous waste. The secondary geomembrane, also 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene, forms a barrier surface for leachate that might penetrate the primary liner. The high-density polyethylene chemically is resistant to constituents in the aqueous waste and has a relatively high strength compared to other lining materials. The high-density polyethylene resin specified for the LERF contains carbon black, antioxidants, and heat stabilizers to enhance its resistance to the degrading effects of UV light. The approach to ensuring the compatibility of aqueous waste streams with the LERF liner materials and piping is discussed in Addendum B, Waste Analysis Plan.

Three geotextile layers are used in the LERF liner system. The layers are thin, nonwoven polypropylene fabric that chemically is resistant, highly permeable, and resistant to microbiological growth. The first two layers prevent fine soil particles from infiltrating and clogging the drainage layer. The second geotextile also provides limited protection for the secondary geomembrane from the drainage rock. The third geotextile layer prevents the mixing of the soil/bentonite admixture with the much more porous and granular foundation material.

A 30.5-centimeter (12-inch)-thick gravel drainage layer on the bottom of the basins between the primary and secondary liners provides a flow path for liquid to the leachate detection, collection, and removal system. A geonet (or drainage net) is located immediately above the secondary geomembrane on the basin sidewalls. The geonet functions as a preferential flow path for liquid between the liners, carrying liquid down to the gravel drainage layer and subsequently to the leachate sump. The geonet is a mesh made of high-density polyethylene, with approximately 13-millimeter (0.5-inch) openings.

The soil/bentonite layer is 91 centimeters (36 inches) thick on the bottom of the basins and 107 centimeters (42 inches) thick on the basin sidewalls; its permeability is less than 1.0E-07 centimeters (3.9E-08 inches) per second. This composite liner design, consisting of a geomembrane laid over essentially impermeable soil/bentonite, is considered best available technology for solid waste landfills and surface impoundments. The combination of synthetic and clay liners is reported in the literature to provide the maximum protection from waste migration (*Flexible Membrane Liners for Solid and Hazardous Waste Landfills - A State of the Art Review*, Forseth and Kmet 1983).

A number of laboratory tests were conducted to measure the engineering properties of the soil/bentonite admixture, in addition to extensive field tests performed on three test fills constructed near the LERF site. For establishing an optimum ratio of bentonite to soil for the soil/bentonite admixture, mixtures of various ratios were tested to determine permeability and shear strength. A mixture of 12 percent bentonite was selected for the soil/bentonite liner and tests described in the following paragraphs demonstrated that the admixture meets the desired permeability of less than 1.0E-07 centimeters (3.9E-08 inches) per second. Detailed discussion of test procedures and results is provided in *Report of Geotechnical Investigation, 242-A Evaporation and PUREX Interim Storage Basins, W-105, Project Number 90-1901* (Chen-Northern 1990).

Direct shear tests were performed according to ASTM D3080 test procedures (*Standard Test Method for Direct Shear Test of Soils Under Consolidation Drained Conditions,* ASTM 1990) on soil/bentonite samples of various ratios. Based on these results, the conservative minimum Mohr-Coulomb shear strength value of 30 degrees was estimated for a soil/bentonite admixture containing 12 percent bentonite.

The high degree of compaction of the soil/bentonite layer [92 percent per ASTM D1557 (*Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 feet-pound/feet)*, ASTM 1991)] was expected to maximize the bonding forces between the clay particles, thereby minimizing moisture transport through the liner. With respect to particle movement ('piping'), estimated fluid velocities in this low-permeability material are too low to move the soil particles. Therefore, piping is not considered a problem.

For the soil/bentonite layer, three test fills were constructed to demonstrate that materials, methods, and procedures used would produce a soil/bentonite liner that meets the EPA permeability requirement of less than 1.0E-07 centimeters (3.9E-08 inches) per second. All test fills met the EPA requirements.

A thorough discussion of construction procedures, testing, and results is provided in *Report of Permeability Testing, Soil-bentonite Test Fill, KEH W-105, Project No 86-19005* (Chen-Northern 1991).

The aqueous waste stored in the LERF is typically a dilute mixture of organic and inorganic constituents. Though isolated instances of soil liner incompatibility have been documented in the literature (*Flexible Membrane Liners for Solid and Hazardous Waste Landfills - A State of the Art Review,* Forseth and Kmet 1983), these instances have occurred with concentrated solutions that were incompatible with the geomembrane liners in which the solutions were contained. Considering the dilute nature of the aqueous waste that is and will be stored in LERF and the moderate pH, and test results demonstrating the compatibility of the high-density polyethylene liners with the aqueous waste (9090 Test Results [WHC-SD-W105-TD-001, 1991]), gross failure of the soil/bentonite layer is not probable.

Each basin also is equipped with a floating very low-density polyethylene cover. The cover is anchored and tensioned at the concrete wall at the top of the dikes, using a patented mechanical tensioning system. Figure C.15 depict the tension mechanism and the anchor wall at the perimeter of each basin. Additional information on the cover system is provided in Section C.5.2.5.

C.5.2.1.1 Material Specifications

Material specifications for the liner system and leachate collection system, including liners, drainage gravel, and drainage net are discussed in the following sections. Material specifications are documented in the *Final Specifications 242-A Evaporator and PUREX Interim Retention Basins* (W-105/83360/ER-0156, KEH 1990) and *Construction Specifications for 242-A Evaporator and PUREX Interim Retention Basins* (W-105, KEH 1990).

Geomembrane Liners. The high-density polyethylene resin for geomembranes for the LERF meets the material specifications listed in Table C.9. Key physical properties include thickness (60-mil [1.5-millimeters] [0.06-inch]) and impermeability (hydrostatic resistance of over 316,000 kilogram per square meter [450 pounds per square inch]). Physical properties meet National Sanitation Foundation Standard 54 (*Flexible Membrane Liners,* NSF 1985). Testing to determine if the liner material is compatible with typical dilute waste solutions was performed and documented in *9090 Test Results* (WHC-SD-W105-TD-001, 1991).

Soil/Bentonite Liner. The soil/bentonite admixture consists of 11.5 to 14.5 percent bentonite mixed into well-graded silty sand with a maximum particle size of 4.75 millimeters (0.187 inch) (No. 4 sieve). Test fills were performed to confirm the soil/bentonite admixture applied at LERF has hydraulic conductivity less than 1.0E-07 centimeters (3.9E-08 inches) per second, as required by WAC 173-303-650(2)(j) for new surface impoundments.

Bentonite Carpet Liner. The bentonite carpet liner consists of bentonite (90 percent sodium montmorillonite clay) in a primary backing of woven polypropylene with nylon filler fiber, and a cover fabric of open weave spunlace polyester. The montmorillonite is anticipated to retard migration of solution through the liner, exhibiting a favorable cation exchange for adsorption of some constituents (such as ammonium). Based on composition of the bentonite carpet and of the type of aqueous waste stored at LERF, no chemical attack, dissolution, or degradation of the bentonite carpet liner is anticipated.

Geotextile. The nonwoven geotextile layers consist of long-chain polypropylene polymers containing stabilizers and inhibitors to make the filaments resistant to deterioration from UV light and heat exposure. The geotextile layers consist of continuous geotextile sheets held together by needle punching. Edges of the fabric are sealed or otherwise finished to prevent outer material from pulling away from the fabric or raveling.

Drainage Gravel. The drainage layer consists of thoroughly washed and screened, naturally occurring rock meeting the size specifications for Grading Number 5 in Washington State Department of Transportation construction specifications (*Standard Specification* for *Road, Bridge, and Municipal Construction,* WSDOT 1988). The specifications for the drainage layer are given in Table C.10. Hydraulic conductivity tests (*Tests of Drainage Rock for the V797 Project, Hanford, Washington; Tests* *of Drainage Rock for the W105 Project, Hanford, Washington; Tests of Drainage Rock for the W105 Project, Hanford, Washington, CNI Word Order No. 2527*, Chen-Northern 1992) showed the drainage rock used at LERF met the sieve requirements and had a hydraulic conductivity of at least 1 centimeter (0.4 inches) per second, which exceeded the minimum of at least 0.1 centimeters (0.04 inches) per second required by WAC 173-303-650(2)(j) for new surface impoundments.

Geonet. The geonet is fabricated from two sets of parallel high-density polyethylene strands, spaced 1.3 centimeters (0.5 inches) center-to-center maximum to form a mesh with minimum two strands per 2.54 centimeter (1 inch) in each direction. The geonet is located between the liners on the sloping sidewalls to provide a preferential flow path for leachate to the drainage gravel and subsequently to the leachate sump.

Leachate Collection Sump. Materials used to line the 3 by 1.8 by 0.30-meter (10 by 6 by 1-feet)-deep leachate sump, at the bottom of each basin in the northwest corner, include [from top to bottom (Figure C.17)]:

- 25 millimeter (1 inch) high-density polyethylene flat stock (supporting the leachate riser pipe)
- Geotextile
- 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene rub sheet
- Secondary composite liner:
    - 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene geomembrane
    - 91 centimeters (36 inches) of soil/bentonite admixture
    - Geotextile

Specifications for these materials are identical to those discussed previously.

Leachate System Risers. Risers for the leachate system consist of 25.4-centimeter (10-inch) and 10.2-centimeter (4-inch) pipes from the leachate collection sump to the catch basin northwest of each basin (Figure C.17). The risers lay below the primary liner in a gravel-filled trench that also extends from the sump to the concrete catch basin (Figure C.17).

The risers are high-density polyethylene pipes fabricated to meet the requirements in ASTM D1248 (ASTM 1989). The 25.4-centimeter (10-inch) riser pipe is perforated every 20.3 centimeters (8 inches) with 1.3-centimeter (0.5-inch) holes around the diameter. Level sensors and leachate pump are inserted in the 25.4-centimeter (10-inch) riser pipe to monitor and remove leachate from the sump. To prevent clogging of the pump and piping with fine particulate, the end of the riser is encased in a gravel-filled box constructed of high-density polyethylene geonet and wrapped in geotextile. The 10.2-centimeter (4-inch) riser pipe is perforated every 10.2 centimeters (4 inches) with 0.64-centimeter (1/4-inch) holes around the diameter. A level detector is inserted in the 10.2-centimeter (4-inch) riser pipe.

Leachate Pump. A deep-well submersible pump, designed to deliver approximately19 liters (5 gallons) per minute, is installed in the 25.4-centimeter (10-inch) leachate riser in each basin. Wetted parts of the leachate pump are made of 316L stainless steel, providing both corrosion resistance and durability.

C.5.2.1.2 Loads on Liner System

The LERF liner system is subjected to the following types of stresses.

Stresses from Installation or Construction Operations. Contractors were required to submit construction quality control plans that included procedures, techniques, tools, and equipment used for the construction and care of liner and leachate system. Methods for installation of all components were screened to ensure that the stresses on the liner system were kept to a minimum.

Calculations were performed to estimate the risk of damage to the secondary high-density polyethylene liner during construction (*Calculations for Liquid Effluent Retention Facility Part B Permit Application* [HNF-SD-LEF-TI-005, 1997]). The greatest risk expected was from spreading the gravel layer over the geotextile layer and secondary geomembrane. The results of the calculations show that the strength of the geotextile was sufficiently high to withstand the stress of a small gravel spreader driving on a minimum of 15 centimeters (6 inches) of gravel over the geotextile and geomembrane. The likelihood of damage to the geomembrane lying under the geotextile was considered low.

To avoid driving heavy machinery directly on the secondary liner, a 28-meter (90-foot) conveyer was used to deliver the drainage gravel into the basins. The gravel was spread and consolidated by hand tools and a bulldozer. The bulldozer traveled on a minimum thickness of 30.5 centimeters (12 inches) of gravel. Where the conveyer assembly was placed on top of the liner, cribbing was placed to distribute the conveyer weight. No heavy equipment was allowed for use directly in contact with the geomembranes.

Additional calculations were performed to estimate the ability of the leachate riser pipe to withstand the static and dynamic loading imposed by lightweight construction equipment riding on the gravel layer (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997). Those calculations demonstrated that the pipe could buckle under the dynamic loading of small construction equipment; therefore, the pipe was avoided by equipment during spreading of the drainage gravel.

Installation of synthetic lining materials proceeded only when winds were less than 24 kilometers (15 miles) per hour, and not during precipitation. The minimum ambient air temperature for unfolding or unrolling the high-density polyethylene sheets was -10 Celsius (C) (14°Fahrenheit [F]), and a minimum temperature of 0 C (32°F) was required for seaming the high-density polyethylene sheets. Between shifts, geomembranes and geotextile were anchored with sandbags to prevent lifting by wind. Calculations were performed to determine the appropriate spacing of sandbags on the geomembrane to resist lifting caused by 130-kilometer (80-mile) per hour winds (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997). All of the synthetic components contain UV light inhibitors and no impairment of performance is anticipated from the short-term UV light exposure during construction. Section C.5.2.4 provides further detail on exposure prevention.

During the laying of the soil/bentonite layer and the overlying geomembrane, moisture content of the admixture was monitored and adjusted to ensure optimum compaction and to avoid development of cracks.

C.5.2.1.3 Static and Dynamic Loads and Stresses from the Maximum Quantity of Waste

When a LERF basin is full, liquid depth is approximately6.8 meters (22.2 feet). Static load on the primary liner is roughly 6,400 kilograms per square meter (9.1 pounds per square inch). Load on the secondary liner is slightly higher because of the weight of the gravel drainage layer. Assuming a density of 805 kilograms per cubic meter (50 pounds per cubic foot) for the drainage gravel [conservative estimate based on specific gravity of 2.65 (*Simplified Design of Building Foundations,* Ambrose 1988)], the secondary high-density polyethylene liner carries approximately 7,200 kilograms per square meter (10.2 pounds per square inch) of load when a basin is full.

Side slope liner stresses were calculated for each of the layers in the basin sidewalls and for the pipe trench on the northwest corner of each basin (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997). Results of these calculations indicate factors of safety against shear were 1.5 or greater for the primary geomembrane, geotextile, geonet, and secondary geomembrane.

Because the LERF is not located in an area of seismic concern, as identified in Appendix VI of 40 CFR 264 and WAC 173-303-282(6)(a)(I), discussion and calculation of potential seismic events are not required.

C.5.2.1.4 Stresses Resulting from Settlement, Subsidence, or Uplift

Uplift stresses from natural sources are expected to have negligible impact on the liner. Groundwater lies approximately 62 meters (200 feet) below the LERF, average annual precipitation is only 16 centimeters (6.3 inches), and the average unsaturated permeability of the soils near the basin bottoms is high, ranging from about 5.5E-04 centimeters (2.2E-04 inches) per second to about 1 centimeter (0.4 inches) per second (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991). Therefore, no hydrostatic uplift forces are expected to develop in the soil underneath the basins. In addition, the soil under the basins consists primarily of gravel and sand, and contains few or no organic constituents. Therefore, uplift caused by gas production from organic degradation is not anticipated.

Based on the design of the soil-bentonite liner, no structural uplift stresses are present within the lining system (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991).

Regional subsidence is not anticipated because neither petroleum nor extractable economic minerals are present in the strata underlying the LERF basins, nor is karst (erosive limestone) topography present.

Dike soils and soil/bentonite layers were compacted thoroughly and proof-rolled during construction. Calculation of settlement potential showed that combined settlement for the foundation and soil/bentonite layer is expected to be about 2.7 centimeters (1.1 inches). Settlement impact on the liner and basin stability is expected to be minimal (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991).

C.5.2.1.5 Internal and External Pressure Gradients

Pressure gradients across the liner system from groundwater are anticipated to be negligible. The LERF is about 62 meters (200 feet) above the seasonal high water table, which prevents buildup of water pressure below the liner. The native gravel foundation materials of the LERF are relatively permeable and free draining. The 2 percent slope of the secondary liner prevents the pooling of liquids on top of the secondary liner. Finally, the fill rate of the basins is slow enough (average 190 liters [50 gallons] per minute) that the load of the liquid waste on the primary liner is gradually and evenly distributed.

To prevent the buildup of gas between the liners, each basin is equipped with 21 vents in the primary geomembrane located above the maximum water level that allow the reduction of any excess gas pressure. Gas passing through these vents exit through a single pipe that penetrates the anchor wall into a carbon adsorption filter. This filter extracts nearly all of the organic compounds, ensuring that emissions to the air from the basins are not toxic.

C.5.2.2 Liner System Location Relative to High-Water Table

The lowest point of each LERF basin is the northwest corner of the sump, where the typical subgrade elevation is 175 meters (574 feet) above mean sea level. Based on data collected from the groundwater monitoring wells at the LERF site, the seasonal high-water table is located approximately 62 meters (200 feet) or more below the lowest point of the basins. This substantial thickness of unsaturated strata beneath the LERF provides ample protection to the liner from hydrostatic pressure because of groundwater intrusion into the soil/bentonite layer. Further discussion of the unsaturated zone and site hydrogeology is provided in Addendum D, Groundwater Monitoring Plan.

C.5.2.3 Liner System Foundation

Foundation materials are primarily gravels and cobbles with some sand and silt. The native soils onsite are derived from unconsolidated Holocene sediments. These sediments are fluvial and glaciofluvial sands and gravels deposited during the most recent glacial and postglacial event. Grain-size distributions and shape analyses of the sediments indicate that deposition occurred in a high-energy environment (*Report of Geotechnical Investigation, 242-A Evaporator and PUREX Interim Storage Basins, Hanford Federal Reservation,* W-105, Project No 90-1901, Chen-Northern 1990).

Analysis of five soil borings from the LERF site was conducted to characterize the natural foundation materials and to determine the suitability of onsite soils for construction of the impoundment dikes and determine optimal design factors. Well-graded gravel containing varying amounts of silt, sand, and cobbles comprises the layer in which the basins were excavated. This gravel layer extends to depths of 10 to 11 meters (33 to 36 feet) below land surface (*Report of Geotechnical Investigation, 242-A Evaporator and PUREX Interim Storage Basins, Hanford Federal Reservation,* W-105, Project No

90-1901, Chen-Northern 1990). The basins are constructed directly on the subgrade. Excavated soils were screened to remove oversize cobbles (greater than 15 centimeters [6 inches] in the largest dimension) and used to construct the dikes.

Settlement potential of the foundation material and soil/bentonite layer was found to be low. The foundation is comprised of undisturbed native soils. The bottom of the basin excavation lies within the well-graded gravel layer, and is dense to very dense. Below the gravel is a layer of dense to very dense poorly graded and well-graded sand. Settlement was calculated for the gravel foundation soils and for the soil/bentonite layer, under the condition of hydrostatic loading from 6.8 meters (22.2 feet) of fluid depth. The combined settlement for the soils and the soil/bentonite layer is estimated to be about 2.7 centimeters (1.1 inches). This amount of settlement is expected to have minimal impact on overall liner or basin stability (*Additional Information for Project W-105, Part B Permit Application,* Chen-Northern 1991). Settlement calculations are provided in *Calculations for Liquid Effluent Retention Facility Part B Permit Application* (HNF-SD-LEF-TI-005, 1997).

The load bearing capacity of the foundation material, based on the soil analysis discussed previously, is estimated at about 48,800 kilograms per square meter (69 pounds per square inch) [maximum advisable presumptive bearing capacity (*Basic Soils Engineering,* Hough 1969)]. Anticipated static and dynamic loading from a full basin is estimated to be less than 9,000 kilograms per square meter (13 pounds per square inch) (Section C.5.2.1.3), which provides an ample factor of safety.

When the basins are empty, excess hydrostatic pressure in the foundation materials under the liner system theoretically could result in uplift and damage. However, because the native soil forming the foundations is unsaturated and relatively permeable, and because the water table is located at a considerable depth beneath the basins, any infiltration of surface water at the edge of the basin is expected to travel predominantly downward and away from the basins, rather than collecting under the excavation itself. No gas is expected in the foundation because gas-generating organic materials are not present.

Subsidence of undisturbed foundation materials is generally the result of fluid extraction (water or petroleum), mining, or karst topography. Neither petroleum, mineral resources, nor karst are believed to be present in the sediments overlying the Columbia River basalts. Potential groundwater resources do exist below the LERF. Even if these sediments were to consolidate from fluid withdrawal, their depth most likely would produce a broad, gently sloping area of subsidence that would not cause significant strains in the LERF liner system. Consequently, the potential for subsidence related failures are expected to be negligible.

Borings at the LERF site, and extensive additional borings in the 200 East Area, have not identified any significant quantities of soluble materials in the foundation soil or underlying sediments (*Hydrogeology of the 200 Are Low-Level Burial Grounds - An Interim* Report, PNL-6820, 1989). Consequently, the potential for sinkholes is considered negligible.

C.5.2.4 Liner System Exposure Prevention

Both primary and secondary geomembranes and the floating cover are stabilized with carbon black to prevent degradation from UV light. Furthermore, none of the liner layers experience long-term exposure to the elements. During construction, thin polyethylene sheeting was used to maintain optimum moisture content and provide protection from the wind for the soil/bentonite layer until the secondary geomembrane was laid in place. The secondary geomembrane was covered by the geonet and geotextile as soon as quality control testing was complete. Once the geotextile layer was completed, drainage material immediately was placed over the geotextile. The final (upper) geotextile layer was placed over the drainage gravel and immediately covered by the bentonite carpet liner. This was covered immediately, in turn, by the primary high-density polyethylene liner.

Both high-density polyethylene liners, geotextile layers, and geonet are anchored permanently to a concrete wall at the top of the basin berm. During construction, liners were held in place with many sandbags on both the basin bottoms and side slopes to prevent wind from lifting and damaging the materials. Calculations were performed to determine the amount of fluid needed in a basin to prevent wind lift damage to the primary geomembrane. Approximately 15 to 20 centimeters (6 to 8 inches) of solution are kept in each basin to minimize the potential for uplifting the primary liner (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997).

The entire lining system is covered by a very low-density polyethylene floating cover that is bolted to the concrete anchor wall. The floating cover prevents evaporation and intrusion from dust, precipitation, vegetation, animals, and birds. A patented tensioning system is employed to prevent wind from lifting the cover and automatically accommodate changes in liquid level in the basins. The cover tension mechanism consists of a cable running from the flexible geosynthetic cover over a pulley on the tension tower (located on the concrete anchor wall) to a dead man anchor. These anchors (blocks) simply hang from the cables on the exterior side of the tension towers. The anchor wall also provides for solid attachment of the liner layers and the cover, using a 6.4-millimeter (1/4-inch) batten and neoprene gasket to bolt the layers to the concrete wall, effectively sealing the basin from the intrusion of light, precipitation, and airborne dust (Figure C.15).

The floating cover, made of very low-density polyethylene with UV light inhibitors, is not anticipated to experience unacceptable degradation during the service life of the LERF. The very low-density polyethylene material contains carbon black for UV light protection, anti-oxidants to prevent heat degradation, and seaming enhancers to improve its ability to be welded. A typical manufacturer's limited warranty for weathering of very low-density polyethylene products is 20 years (Poly America, undated). This provides a margin of safety for the anticipated medium-term use of the LERF for aqueous waste storage.

The upper 3.4 to 4.6 meters (11 to 15 feet) of the sidewall liner also could experience stresses in response to temperature changes. Accommodation of thermal influences for the LERF geosynthetic layers is affected by inclusion of sufficient slack as the liners were installed. Calculations demonstrate that approximately 67 centimeters (2.2 feet) of slack is required in the long basin bottom dimension, 46 centimeters (1.5 feet) across the basin, and 34 centimeters (1.1 feet) from the bottom of the basin to the top of the basin wall (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997).

Thermal stresses also are experienced by the floating cover. As with the geomembranes, sufficient slack was included in the design to accommodate thermal contraction and expansion.

C.5.2.4.1 Liner Repairs During Operations

Should repair of a basin liner be required while the basin is in operation, a sufficient quantity of the basin contents will be transferred to the 200 Area ETF or another available basin to allow access for the repair activities. After the liner around the leaking or damaged section is cleaned, repairs to the geomembrane will be made as recommended by the liner vendor or others knowledgeable in liner repair; such as a professional engineer that has adequate knowledge and experience to make recommendations in liner repairs. The criteria for selecting a person or company to make liner repair recommendations is determined by the Permittees for the LERF basins. Selection criteria could include educational background, related experience, and professional qualifications.

C.5.2.4.2 Control of Air Emissions

The floating covers limit evaporation of aqueous waste and releases of volatile organic compounds into the atmosphere. To accommodate volumetric changes in the air between the fluid in the basin and the cover, and to avoid problems related to 'sealing' the basins too tightly, each basin is equipped with a carbon filter breather vent system. Any air escaping from the basins must pass through this vent, consisting of a pipe that penetrates the anchor wall and extends into a carbon adsorption filter unit.

C.5.2.5 Liner Coverage

The liner system covers the entire ground surface that underlies the retention basins. The primary liner extends up the side slopes to a concrete anchor wall at the top of the dike encircling the entire basin (Figure C.15).

C.5.3 Prevention of Overtopping

Overtopping prevention is accomplished through administrative controls and liquid-level instrumentation installed in each basin. The instrumentation includes local liquid-level indication as well as remote indication at the 200 Area ETF. Before an aqueous waste is transferred into a basin, administrative controls are implemented to ensure overtopping will not occur during the transfer. The volume of feed to be transferred is compared to the available volume in the receiving basin. The transfer is not initiated unless there is sufficient volume available in the receiving basin or a cut-off level is established. The transfer into the basin would be stopped when this cut-off level is reached.

In the event of a 25-year, 24-hour storm event, precipitation would accumulate on the basin covers. Through the self-tensioning design of the basin covers and maintenance of adequate freeboard, all accumulated precipitation would be contained on the covers and none would flow over the dikes or anchor walls. The 25-year, 24-hour storm is expected to deliver 5.3 centimeters (2.1 inches) of rain or approximately 0.61 meter (2 feet) of snow. Cover specifications include the requirement that the covers be able to withstand the load from this amount of precipitation. Because the cover floats on the surface of the fluid in the basin, the fluid itself provides the primary support for the weight of the accumulated precipitation. Through the cover self-tensioning mechanism, there is ample 'give' to accommodate the overlying load without overstressing the anchor and attachment points.

Rainwater and snow evaporate readily from the cover, particularly in the arid Hanford Facility climate, where evaporation rates exceed precipitation rates for most months of the year. The black color of the cover further enhances evaporation. Thus, the floating cover prevents the intrusion of precipitation into the basin and provides for evaporation of accumulated rain or snow.

C.5.3.1 Freeboard

Under current operating conditions, 0.61 meter (2 feet) of freeboard is maintained at each LERF basin, which corresponds to an operating level of 6.8 meters (22.2 feet), or operating capacity 29.5 million liters (7.8 million gallons).

C.5.3.2 Immediate Flow Shutoff

The mechanism for transferring aqueous waste is either through pump transfers with on/off switches or through gravity transfers with isolation valves. These methods provide positive ability to shut off transfers immediately in the event of overtopping. Overtopping a basin during a transfer is very unlikely because the low flow rate into the basin provides long response times. At a flow rate of 284 liters (75 gallons) per minute, approximately 11 days would be required to fill a LERF basin from the maximum operating level to overflow level.

C.5.3.3 Outflow Destination

Aqueous waste in the LERF is transferred routinely to 200 Area ETF for treatment. However, should it be necessary to immediately empty a basin, the aqueous waste either would be transferred to the 200 Area ETF for treatment or transferred to another basin (or basins), whichever is faster. If necessary, a temporary pumping system may be installed to increase the transfer rate.

C.5.4 Structural Integrity of Dikes

The structural integrity of the dikes was certified attesting to the structural integrity of the dikes, signed by a qualified, registered professional engineer.

C.5.4.1 Dike Design, Construction, and Maintenance

The dikes of the LERF are constructed of onsite native soils, generally consisting of cobbles and gravels. Well-graded mixtures were specified, with cobbles up to 15 centimeters (6 inches) in the largest dimension, but not constituting more than 20 percent of the volume of the fill. The dikes are designed with a 3:1 (3 units horizontal to 1 unit vertical) slope on the basin side, and 2.25:1 on the exterior side. The dikes are approximately 8.2 meters (26.9 feet) high from the bottom of the basin, and 3 meters above (10 feet) grade.

Calculations were performed to verify the structural integrity of the dikes (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997). The calculations demonstrate that the structural strength of the dikes is such that, without dependence on any lining system, the sides of the basins can withstand the pressure exerted by the maximum allowable quantity of fluid in the impoundment. The dikes have a factor of safety greater than 2.5 against failure by sliding.

C.5.4.2 Dike Stability and Protection

In the following paragraphs, various aspects of stability for the LERF dikes and the concrete anchor wall are presented, including slope failure, hydrostatic pressure, and protection from the environment.

Failure in Dike/Impoundment Cut Slopes. A slope stability analysis was performed to determine the factor of safety against slope failure. The computer program 'PCSTABL5' from Purdue University, using the modified Janbu Method, was employed to evaluate slope stability under both static and seismic loading cases. One hundred surfaces per run were generated and analyzed. The assumptions used were as follows (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991):

- Weight of gravel: 2,160 kilograms per cubic meter (135 pounds per cubic foot).
- Maximum dry density of gravel: 2,315 kilograms per cubic meter (144.5 pounds per cubic foot).
- Mohr-Coulomb shear strength angle for gravel: minimum 33 degrees.
- Weight of soil/bentonite: 1,600 kilograms per cubic meter (100 pounds per cubic foot).
- Mohr-Coulomb shear strength angle for soil/bentonite: minimum 30 degrees.
- Slope: 3 horizontal: 1 vertical.
- No fluid in impoundment (worst case for stability).
- Soils at in-place moisture (not saturated conditions).

Results of the static stability analysis showed that the dike slopes were stable with a minimum factor of safety of 1.77 (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991).

The standard horizontal acceleration required in the *Hanford Plant Standards*, "Standard Architectural-Civil Design Criteria, Design Loads for Facilities" (HPS-SDC-4.1, DOE-RL 1988), for structures on the Hanford Site is 0.12 g-force. Adequate factors of safety for cut slopes in units of this type generally are considered 1.5 for static conditions and 1.1 for dynamic stability (Site *Investigation Report, Non-Drag-Off Landfill* Site *Low-Level Burial Area No. 5, 200 West Area,* Golder 1989). Results of the stability analysis showed that the LERF basin slopes were stable under horizontal accelerations of 0.10 and 0.15 g-force, with minimum factors of safety of 1.32 and 1.17, respectively (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991). Printouts from the PCSTABL5 program are provided in *Calculations for Liquid Effluent Retention Facility Part B Permit Application* (HNF-SD-LEF-TI-005, 1997).

Hydrostatic Pressure. Failure of the dikes due to buildup of hydrostatic pressure, caused by failure of the leachate system or liners, is very unlikely. The liner system is constructed with two essentially impermeable layers consisting of a synthetic layer overlying a soil layer with low-hydraulic conductivity. It would require a catastrophic failure of both liners to cause hydrostatic pressures that could endanger dike integrity. Routine inspections of the leachate detection system, indicating quantities of leachate removed from the basins, provide an early warning of leakage or operational problems that could lead to excessive hydrostatic pressure. A significant precipitation event (e.g., a 25-year, 24-hour storm) will not create a hydrostatic problem because the interior sidewalls of the basins are covered completely by the liners. The covers can accommodate this volume of precipitation without overtopping the dike (Section C.5.3), and the coarse nature of the dike and foundation materials on the exterior walls provides for rapid drainage of precipitation away from the basins.

Protection from Root Systems. Risk to structural integrity of the dikes because of penetrating root systems is minimal. Excavation and construction removed all vegetation on and around the impoundments, and native plants (such as sagebrush) grow very slowly. The large grain size of the cobbles and gravel used as dike construction material do not provide an advantageous germination medium for native plants. Should plants with extending roots become apparent on the dike walls, the plants will be controlled with appropriate herbicide application.

Protection from Burrowing Mammals. The cobble size materials that make up the dike construction material and the exposed nature of the dike sidewalls do not offer an advantageous habitat for burrowing mammals. Lack of vegetation on the LERF site discourages foraging. The risk to structural integrity of the dikes from burrowing mammals is therefore minimal. Periodic visual inspections of the dikes provide observations of any animals present. Should burrowing mammals be noted onsite, appropriate pest control methods such as trapping or application of rodenticides will be employed.

Protective Cover. Approximately 7.6 centimeters (3 inches) of crushed gravel serve as the cover of the exterior dike walls. This coarse material is inherently resistant to the effect of wind because of its large grain size. Total annual precipitation is low (16 centimeters [6.3 inches]) and a significant storm event (e.g., a 25-year, 24-hour storm) could result in about 5.3 centimeters (2.1 inches) of precipitation in a 24-hour period. The absorbent capacity of the soil exceeds this precipitation rate; therefore, the impact of wind and precipitation run-on to the exterior dike walls will be minimal.

C.5.5 Piping Systems

Aqueous waste from the 242-A Evaporator is transferred to the LERF using a pump located in the 242-A Evaporator and approximately 1,500 meters (5,000 feet) of pipe, consisting of a 7.6-centimeter (3-inch) carrier pipe within a 15.2-centimeter (6-inch) outer containment pipeline. Flow through the pump is controlled by a valve, at flow rates from 150 to 300 liters (40 to 80 gallons) per minute. The pipeline exits the 242-A Evaporator below grade and remains below grade at a minimum 1.2-meter (4-feet) depth for freeze protection, until the pipeline emerges at the LERF catch basin, at the corner of each basin. All piping at the catch basin that is less than 1.2 meters (4 feet) below grade is wrapped with electric heat tracing tape and insulated for protection from freezing.

The transfer line from the 242-A Evaporator is centrifugally cast, fiberglass-reinforced epoxy thermoset resin pressure pipe fabricated to meet the requirements of ASME D2997, *Standard Specification for Centrifigally Cast Reinforced Thermosetting Resin Pipe* (ASME 1984). The 7.6-centimeter (3-inch) carrier piping is centered and supported within 15.2-centimeter (6-inch) containment piping. Pipe supports are fabricated of the same material as the pipe, and meet the strength requirements of ANSI B31.3, *Process Piping Guide* (ANSI 1987) for dead weight, thermal, and seismic loads. A catch basin is provided at the northwest corner of each basin where piping extends from the basin to allow for basin-to-basin and basin-to-200 Area ETF liquid transfers. Drawing H-2-88766, Sheets 1 through 4, provide schematic diagrams of the piping system at LERF. Drawing H-2-79604 provides details of the piping from the 242-A Evaporator to LERF.

C.5.5.1 Secondary Containment System for Piping

The 15.2-centimeter (6-inch) containment piping encases the 7.6-centimeter (3-inch) carrier pipe from the 242-A Evaporator to the LERF. All of the piping and fittings that are not directly over a catch basin or a basin liner are of this pipe-within-a-pipe construction. A catch basin is provided at the northwest corner of each basin where the inlet pipes, leachate risers, and transfer pipe risers emerge from the basin.

The catch basin consists of a 20-centimeter (8-inch)-thick concrete pad at the top of the dike. The perimeter of the catch basin has a 20-centimeter (8-inch)-high curb and the concrete is coated with a chemical resistant epoxy sealant. The concrete pad is sloped so that any leaks or spills from the piping or pipe connections will drain into the basin. The catch basin provides an access point for inspecting, servicing, and operating various systems such as transfer valving, leachate level instrumentation and leachate pump. Drawing H-2-79593 provides a schematic diagram of the catch basins.

C.5.5.2 Leak Detection System

During operation, the 242-A Evaporator receives dilute tank waste directly from the Tank Farms, treats waste by evaporation, and returns the concentrated waste to Tank Farms. The process condensate that is generated is transferred to LERF. Single-point electronic leak detection elements are installed along the transfer line at 305-meter (1,000-feet) intervals. The leak detection elements are located in the bottom of specially designed test risers. Each sensor element employs a conductivity sensor, which is connected to a cable leading back to the 242-A Evaporator Control Room. If a leak develops in the carrier pipe, fluid will travel down the exterior surface of the carrier pipe or the interior of the containment pipe. As moisture contacts a sensor unit, an alarm sounds in the 200 Area ETF Control Room, which is monitored continuously when the 242-A Evaporator is transferring liquids to LERF. If the alarm sounds, 200 Area ETF Operations staff troubleshoots the alarm and, upon verification of a leak, requests that the pump located in the 242-A Evaporator be shut down to stop the flow of process condensate through the transfer line. The 242-A Evaporator has limited surge capacity, and its operation is closely tied to supporting Tank Farm operations. The flow of process condensate to LERF is not stopped automatically by indication of a possible leak in the primary transfer line. A low-volume air purge of the annulus between the carrier pipe and the containment pipe is provided to prevent condensation buildup and minimize false alarms by the leak detection elements.

The catch basins have conductivity leak detectors that alarm in the 200 Area ETF Control Room. Leak detector alarms are monitored in the 200 Area Control Room continuously during aqueous waste transfers and at least daily when no transfers are occurring. Leaks into the catch basins drain back to the basin through a 5.1-centimeter (2-inch) drain on the floor of the catch basin.

C.5.5.3 Certification

Although an integrity assessment is not required for piping associated with surface impoundments, an assessment of the transfer liner was performed, including a hydrostatic leak/pressure test at 10.5 kilograms per square centimeter (150 pounds per square inch) gauge. A statement by an independent, qualified, registered professional engineer attesting to the integrity of the piping system is included in *Integrity Assessment Report for the 242-A Evaporator/LERF Waste Transfer Piping, Project W105* (WHC-SD-WM-ER-112, 1993), along with the results of the leak/pressure test.

C.5.6 Double Liner and Leak Detection, Collection, and Removal System

The double-liner system for LERF is discussed in Section C.5.2. The leachate detection, collection, and removal system (Figures C.16 and C.17) as designed and constructed to remove leachate that might permeate the primary liner. System components for each basin include:

- 30.5-centimeter (12-inch) layer of drainage gravel below the primary liner at the bottom of the basin.
- Geonet below the primary liner on the sidewalls to direct leachate to the gravel layer.
- 3 by 1.8 by 0.30-meter (10 by 6 by 1-feet)-deep leachate collection sump consisting of a 25 millimeter (1-inch) high-density polyethylene flat stock, geotextile to trap large particles in the leachate, and 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene rub sheet set on the secondary liner.
- 25.4-centimeter (10-inch) and 10.2-centimeter (4-inch) perforated leachate high-density polyethylene riser pipes from the leachate collection sump to the catch basin northwest of the basin.

- Leachate collection sump level instrumentation installed in the 10.2-centimeter (4-inch) riser pipe.
- Level sensors, submersible leachate pump, and 3.8-centimeter (1.5-inch) fiberglass-reinforced epoxy thermoset resin pressure piping installed in the 25.4-centimeter (10-inch) riser pipe.
- Piping at the catch basin to route the leachate through 3.8-centimeter (1.5-inch) high-density polyethylene pipe back to the basins.

The bottom of the basins has a two percent slope to allow gravity flow of leachate to the leachate collection sump. This exceeds the minimum of 1 percent slope required by WAC 173-303-650(j) for new surface impoundments. Material specifications for the leachate collection system are given in Section C.5.2.1.1.

Calculations demonstrate that fluid from a small hole (2 millimeter [0.08 inch]) (*Requirements for Hazardous Waste Landfill Design, Construction, and Closure,* EPA/625/4-89/022, 1989, p. 122) at the furthest end of the basin, under a low head situation, would travel to the sump in less than 24 hours (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997). Additional calculations indicate the capacity of the pump to remove leachate is sufficient to allow time to readily identify a leak and activate emergency procedures (HNF-SD-LEF-TI-005, 1997).

The fluid level in each leachate sump is required to be maintained below 33 centimeters (13 inches) to prevent significant liquid backup into the drainage layer. The leachate pump is activated when the liquid level in the sump reaches about 28 centimeters (11 inches), and is shut off when the sump liquid level reaches about 18 centimeters (7 inches). This operation may be done either manually or automatically. Liquid level control is accomplished with conductivity probes that trigger relays selected specifically for application to submersible pumps and leachate fluids. A flow meter/totalizer on the leachate return pipe measures fluid volumes pumped and pumping rate from the leachate collection sumps, and indicates volume and flow rate on local readouts. In addition, a timer on the leachate pump tracks the cumulative pump operating time. Other instrumentation provided is real-time continuous level monitoring with readout at the catch basin. Leachate levels are monitored at least weekly. A sampling port is provided in the leachate piping system at the catch basin. The leak rate through the primary liner can be calculated using two methods: 1) measured as the leachate flow meter/totalizer readings (flow meters/totalizers are located on the outflow line from the collection sumps in the bottom of the LERF basins), and 2) calculated using the pump operating time readings multiplied by the pump flow rate (the pump runs at a constant flow rate). Calculations using either method are sufficient for compliance. For more information on inspections, refer to Addendum I.

The stainless steel leachate pump delivers 19 liters (5 gallons) per minute. The leachate pump returns draw liquid from the sump via 3.8-centimeter (1.5-inch) pipe and discharges into the basin through 3.8-centimeter (1.5-inch) high-density polyethylene pipe.

C.5.7 Construction Quality Assurance

The construction quality assurance plan and complete report of construction quality assurance inspection and testing results are provided in *242-A Evaporator Interim Retention Basin Construction Quality Assurance Plan* (CQAPLN2.QS.1149, Rev. 4, KEH 1991). A general description of construction quality assurance procedures is outlined in the following paragraphs.

For excavation of the basins and construction of the dikes, regular inspections were conducted to ensure compliance with procedures and drawings, and compaction tests were performed on the dike soils.

For the soil/bentonite layer, test fills were first conducted in accordance with EPA guidance to demonstrate compaction procedures and to confirm compaction and permeability requirements can be met. The ratio of bentonite to soil and moisture content was monitored; lifts did not exceed 15 centimeters (6 inches) before compaction, and specific compaction procedures were followed. Laboratory and field tests of soil properties were performed for each lift and for the completed test fill.

The same suite of tests was conducted for each lift during the laying of the soil/bentonite admixture in the basins.

Geotextiles and geomembranes were laid in accordance with detailed procedures and quality assurance programs provided by the manufacturers and installers. These included destructive and nondestructive tests on the geomembrane seams, and documentation of field test results and repairs.

C.5.8 Proposed Action Leakage Rate and Response Action Plan

An action leakage rate limit is established where action must be taken due to excessive leakage from the primary liner. The action leak rate is based on the maximum design flow rate the leak detection system can remove without the fluid head on the bottom liner exceeding 30 centimeters (12 inches). The limiting factor in the leachate removal rate is the hydraulic conductivity of the drainage gravel. An action leakage rate (also called the rapid or large leak rate) of 20,000 liters per hectare (2,100 gallons per acre) per day was calculated for each basin (*Calculation of the Rapid or Large Leak Rate for LERF Basins in the 200 East Area,* WHC-SD-EN-TI-009, 1992).

When it is determined that the action leakage rate has been exceeded, the response action plan will follow the actions in WAC 173-303-650(11)(b) and (c), which includes notification of Ecology in writing within 7 days, assessing possible causes of the leak, and determining whether waste receipt should be curtailed and/or the basin emptied.

C.5.9 Dike Structural Integrity Engineering Certification

The structural integrity of the dikes was certified attesting to the structural integrity of the dikes, signed by a qualified, registered professional engineer.

C.5.10 Management of Ignitable, Reactive, or Incompatible Wastes

Although ignitable or reactive aqueous waste might be received in small quantities at LERF, such aqueous waste is mixed with dilute solutions in the basins, removing the ignitable or reactive characteristics. For compatibility requirements with the LERF liner, refer to Addendum B, Waste Analysis Plan.

C.6 Air Emissions Control

This section addresses the 200 Area ETF requirements of Air Emission Standards for Process Vents, under 40 CFR 264, Subpart AA (WAC 173-303-690 incorporated by reference) and Subpart CC. The requirements of 40 CFR 264, Subpart BB (WAC 173-303-691) is not applicable because aqueous waste with 10 percent or greater organic concentration would not be acceptable for processing at the ETF.

C.6.1 Applicability of Subpart AA Standards

The Evaporator Vapor Body Vessel and thin film dryer perform operations that specifically require evaluation for applicability of WAC 173-303-690. Aqueous waste in these units routinely contains greater than 10 parts per million concentrations of organic compounds and are, therefore, subject to air emission requirements under WAC 173-303-690. Organic emissions from all affected process vents on the Hanford Facility must be less than 1.4 kilograms (3 pounds) per hour and 2.8 mega grams (3.1 tons) per year, or control devices must be installed to reduce organic emissions by 95 percent.

The vessel off gas system provides a process vent system. This system provides a slight vacuum on the 200 Area ETF process vessels and tanks (see Section C.2.5.2). Two vessel vent header pipes combine and enter the vessel off gas system filter unit consisting of a demister, electric heater, prefilter, high-efficiency particulate air filters, activated carbon absorber, and two exhaust fans (one fan in service while the other is backup). The vessel off gas system filter unit is located in the high-efficiency particulate air filter room west of the 2025-E Process Area. The vessel off gas system exhaust discharges into the larger building ventilation system, with the exhaust fans and stack located outside and immediately west of the ETF. The exhaust stack discharge point is 15.5 meters (51 feet) above ground level.

The annual average flow rate for the 200 Area ETF stack (which is the combined vessel off gas and building exhaust flow rates) is 1600 cubic meters (56,000 cubic feet) per minute with a total annual flow of approximately 8.4 E+08 cubic meters (2.9E+10 cubic feet). During waste processing, the airflow through just the vessel off gas system is about 23 standard cubic meters (800 standard cubic feet) per minute.

Organic emissions occur during waste processing, which occurs less than 310 days each year (i.e., 85 percent operating efficiency). This operating efficiency represents the maximum annual operating time for the ETF, as shutdowns are required during the year for planned maintenance outages and for reconfiguring the 200 Area ETF to accommodate different aqueous waste.

C.6.2 Process Vents - Demonstrating Compliance

This section outlines how the 200 Area ETF complies with the requirements and includes a discussion of the basis for meeting the organic emissions limits, calculations demonstrating compliance, and conditions for reevaluation.

C.6.2.1 Basis for Meeting Limits/Reductions

The 242-A Evaporator and the 200 Area ETF are currently the only operating TSD units that contribute to the Hanford Facility volatile organic emissions under 40 CFR 264, Subpart AA. The combined release rate is currently well below the threshold of 1.4 kilograms (3 pounds) per hour and 2.8 mega grams (3.1 tons) per year of volatile organic compounds. As a result, the 200 Area ETF meets these standards without the use of air pollution control devices.

The amount of organic emissions could change as waste streams are changed, or TSD units are brought online or are deactivated. The organic air emissions summation will be re-evaluated periodically as condition warrants. Operations of the TSD units operating under 40 CFR 264, Subpart AA, will be controlled to maintain Hanford Facility emissions below the threshold limits or pollution control device(s) will be added, as necessary, to achieve the reduction standards specified under 40 CFR 264, Subpart AA.

C.6.2.2 Demonstrating Compliance

Calculations to determine organic emissions are performed using the following assumptions:

- Maximum flow rate from LERF to 200 Area ETF is 568 liters (150 gallons) per minute.
- Emissions of organics from tanks and vessels upstream of the UV/OX process are determined from flow and transfer rates given in *Clean Air Act Requirements, WAC 173-400, and As-built Documentation, Project C-018H, 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility* (Adtechs 1995).
- UV/OX reaction rate constants and residence times are used to determine the amount of organics, which are destroyed in the UV/OX process. These constants are given in *200 Area Effluent Treatment Facility Delisting Petition* (DOE/RL-92-72 1993).
- All organic compounds that are not destroyed in the UV/OX process are assumed to be emitted from the tanks and vessels into the vessel off gas system.
- No credit for removal of organic compounds in the vessel off gas system carbon absorber unit is taken. The activated carbon absorbers are used if required to reduce organic emissions.

The calculation to determine organic emissions consists of the following steps:

1. Determine the quantity of organics emitted from the tanks or vessels upstream of the UV/OX process, using transfer rate values.
2. Determine the concentration of organics in the waste after the UV/OX process using UV/OX reaction rates and residence times. If the 200 Area ETF is configured such that the UV/OX process is not used, a residence time of zero is used in the calculations (i.e., none of the organics are destroyed).

3. Assuming all the remaining organics are emitted, determine the rate which the organics are emitted using the feed flow rate and the concentrations of organics after the UV/OX process.
4. The amount of organics emitted from the vessel off gas system is the sum of the amount calculated in steps 1 and 3.

The organic emission rates and quantity of organics emitted during processing are determined using these calculations and are included in the Hanford Facility Operating Record, LERF and 200 Area ETF file.

C.6.2.3 Reevaluating Compliance with Subpart AA Standards

Calculations to determine compliance with Subpart AA will be reviewed when any of the following conditions occur at the 200 Area ETF:

- Changes in the maximum feed rate to the 200 Area ETF (i.e., greater than the 568 liters (150 gallons) per minute flow rate).
- Changes in the configuration or operation of the 200 Area ETF that would modify the assumptions given in Section C.6.2.2 (e.g., taking credit for the carbon absorbers as a control device).
- Annual operating time exceeds 310 days.

C.6.3 Applicability of Subpart CC Standards

The air emission standards of 40 CFR 264, Subpart CC apply to tank, surface impoundment, and container storage units that manage wastes with average volatile organic concentrations equal to or exceeding 500 parts per million by weight, based on the hazardous waste composition at the point of origination (61 FR 59972). However, TSD units that are used solely for management of mixed waste are exempt. Mixed waste is managed at the LERF and 200 Area ETF and dangerous waste could be treated and stored at these TSD units.

TSD owner/operators are not required to determine the concentration of volatile organic compounds in a hazardous waste if the wastes are placed in waste management units that employ air emission controls that comply with the Subpart CC standards. Therefore, the approach to Subpart CC compliance at the LERF and 200 Area ETF is to demonstrate that the LERF and 200 Area ETF meet the Subpart CC control standards (40 CFR 264.1084 – 40 CFR 264.1086).

C.6.3.1 Demonstrating Compliance with Subpart CC for Tanks

Since the 200 Area ETF tanks already have process vents regulated under 40 CFR 264, Subpart AA (WAC 173-303-690), they are exempt from Subpart CC [40 CFR 264.1080(b)(8)].

C.6.3.2 Demonstrating Compliance with Subpart CC for Containers

Container Level 1 and Level 2 standards are met at the 200 Area ETF by managing all dangerous and/or mixed wastes in U.S. Department of Transportation containers [40 CFR 264.1086(f)]. Level 1 containers are those that store more than 0.1 cubic meters (3.5 cubic feet) and less than or equal to 0.46 cubic meters (16 cubic feet). Level 2 containers are used to store more than 0.46 cubic meters (16 cubic feet) of waste, which are in 'light material service'. Light material service is defined where a waste in the container has one or more organic constituents with a vapor pressure greater than 0.3 kilograms per square meter (0.04 pounds per square inch) at 20°C (68°F), and the total concentration of such constituents is greater than or equal to 20 percent by weight.

The monitoring requirements for Level 1 and Level 2 containers must include a visual inspection when the container is received at the 200 Area ETF, when waste is initially placed in the container, and at least once every 12 months when stored onsite for 1 year or more.

If compliant containers are not used at the 200 Area ETF, alternate container management practices are used that comply with the Level 1 standards. Specifically, the Level 1 standards allow for a "container equipped with a cover and closure devices that form a continuous barrier over the container openings such that when the cover and closure devices are secured in the closed position there are no visible holes, gaps, or other open spaces into the interior of the container. The cover may be a separate cover installed on the container...or may be an integral part of the container structural design..." [40 CFR 264.1086(c)(1)(ii)]. An organic-vapor-suppressing barrier, such as foam, may also be used [40 CFR 264.1086(c)(1)(iii)]. Section C.3 provides detail on container management practices at the 200 Area ETF.

Container Level 3 standards apply when a container is used for the "treatment of a hazardous waste by a waste stabilization process" [40 CFR 264.1086(2)]. Because treatment in containers using the stabilization process is not provided at the 200 Area ETF, these standards do not apply.

C.6.3.3 Demonstrating Compliance with Subpart CC for Surface Impoundments

The Subpart CC emission standards are met at LERF using a floating membrane cover that is constructed of very-low-density polyethylene that forms a continuous barrier over the entire surface area [40 CFR 264.1085(c)]. This membrane has both organic permeability properties equivalent to a high-density polyethylene cover and chemical/physical properties that maintain the material integrity for the intended service life of the material. The additional requirements for the floating cover at the LERF have been met (Section C.5.2.4).

C.7 Engineering Drawings

C.7.1 Liquid Effluent Retention Facility

Drawings of the containment systems at the LERF are summarized in Table C.1. Because the failure of these containment systems at LERF could lead to the release of dangerous waste into the environment, modifications that affect these containment systems will be submitted to the Washington State Department of Ecology, as a Class 1, 2, or 3 Permit modification, as required by WAC 173-303-830.

Table C.1. Liquid Effluent Retention Facility Containment System

LERF System	Drawing Number	Drawing Title
Bottom Liner	H-2-79590, Sheet 1	Civil Plan, Sections & Det; Cell Basin Bottom Liner
Top Liner	H-2-79591, Sheet 1	Civil Plan, Sections & Det; Cell Basin Top Liner
Catch Basin	H-2-79593, Sheet 1, 3-5	Civil Plan, Sections & Det; Catch Basin

The drawings identified in Table C.2 illustrate the piping and instrumentation configuration within LERF, and of the transfer piping systems between the LERF and the 242-A Evaporator. These drawings are provided for general information, and to demonstrate the adequacy of the design of the LERF as a surface impoundment.

Table C.2. Liquid Effluent Retention Facility Piping and Instrumentation

LERF System	Drawing Number	Drawing Title
Transfer Piping to 242-A Evaporator	H-2-79604, Sheet 1	Piping Plot & Key Plans; 242-A Evap Cond Stream
LERF Piping and Instrumentation	H-2-88766, Sheet 1	P&ID; LERF Basin & ETF Influent Evaporator
	H-2-88766, Sheet 2	P&ID; LERF Basin & ETF Influent
	H-2-88766, Sheet 3	P&ID; LERF Basin & ETF Influent
	H-2-88766, Sheet 4	P&ID; LERF Basin & ETF Influent
Legend	H-2-89351, Sheet 1	Piping & Instrumentation Diagram - Legend

C.7.2 200 Area Effluent Treatment Facility

Drawings of the secondary containment systems for the 200 Area ETF containers, and tanks and process units, and for the Load-In Station tanks are summarized in Table C.3. Because the failure of the secondary containment systems could lead to the release of dangerous waste into the environment, modifications, which affect the secondary containment systems, will be submitted to the Washington State Department of Ecology, as a Class 1, 2, or 3 Permit modification, as required by WAC 173-303-830.

Table C.3. Building 2025-E and Load-In Station Secondary Containment Systems

200 Area ETF Process Unit	Drawing Number	Drawing Title
Surge Tank, Process/2025-E Container Storage Areas and Trenches - Foundation and Containment	H-2-89063, Sheet 1	Structural Foundation & Grade Beam Plan
Sump Tank Containment	H-2-89065, Sheet 1	Structural Foundation, Sections & Details
Verification Tank Foundation and Containment	H-2-89068, Sheet 1	Structural Verification Tank Foundations
Load-In Station Foundation and Containment	H-2-817970, Sheet 1	Structural ETF Truck Load-in Facility Plans and Sections
Load-In Station Foundation and Containment	H-2-817970, Sheet 2	Structural ETF Truck Load-in Facility Plans and Sections

The drawings identified in Table C.4 provide an illustration of the piping and instrumentation configuration for the major process units and tanks at the 200 Area ETF, and the Load-In Station tanks. Drawings of the transfer piping systems between the LERF and 200 Area ETF, and between the Load-In Station and the 200 Area ETF also are presented in this table. These drawings are provided for general information, and to demonstrate the adequacy of the design of the tank systems.

Table C.4. Major Process Units and Tanks at Building 2025-E and Load-In Station

200 Area ETF Process Unit	Drawing Number	Drawing Title
Load-In Station	H-2-817974, Sheet 1	P&ID – ETF Truck Load-In Facility
Load-In Station	H-2-817974, Sheet 2	P&ID – ETF Truck Load-In Facility
Surge Tank	H-2-89337, Sheet 1	P&ID – Surge Tank System
UV/Oxidation	H-2-88976, Sheet 1	P&ID – UV Oxidizer Part 1
UV/Oxidation	H-2-89342, Sheet 1	P&ID – UV Oxidizer Part 2
Reverse Osmosis	H-2-88980, Sheet 1	P&ID – 1st RO Stage
Reverse Osmosis	H-2-88982, Sheet 1	P&ID – 2nd RO Stage
IX/Polishers	H-2-88983, Sheet 1	P&ID – Polisher
Verification Tanks	H-2-88985, Sheet 1	P&ID – Verification Tank System
Evaporator Vapor Body Vessel	H-2-89335, Sheet 1	P&ID – Evaporator
Thin Film Dryer	H-2-88989, Sheet 1	P&ID – Thin Film Dryer
Transfer Piping from LERF to building 2025-E	H-2-88768, Sheet 1	Piping Plan/Profile 4"– 60M-002-M17 and 3"-60M-001-M17
Transfer Piping from Load-In Station to building 2025-E	H-2-817969, Sheet 1	Civil – ETF Truck Load-In Facility Site Plan

Table C.5. 200 Area Effluent Treatment Facility Tank Systems Information

Tank Description	Material of Construction[1]	Unit of Measure	Maximum Tank Capacity[2] liter/gallon	Inner diameter meter/feet	Height meter/feet	Shell Thickness[3] centimeter/inch
Load-In Station tanks 2025ED-59A-TK-109 2025ED-59A TK-117	304 SS	Metric	34,350	3.6	4.7	0.64
		Standard	9,100	12	15.4	1/4
Load-In Station tank 2025ED-59A-TK-1	FRP	Metric	26,000	3.0	3.8	0.48 (dome) 0.63 (walls & bottom)
		Standard	6,900	10	11.5	3/16 1/4
Surge tank 2025E-60A TK 1	304 SS	Metric	462,000	7.9	9.2	0.48
		Standard	122, 000	26	30	3/16
pH adjustment tank 2025E-60C-TK-1	304 SS	Metric	16,700	3.0	2.5	0.64
		Standard	4,400	10	8	1/4
First RO feed tank 2025E-60F-TK-l	304 SS	Metric	20,600	3.0	3.2	0.64
		Standard	5,400	10	10.5	1/4
Second RO feed tank 2025E-60F-TK-2	304 SS	Metric	9,000	3.0 x 1.5	1.5	0.48 w/rib stiffeners
		Standard	2,400	10 X 5	5	3/16
Effluent pH adjustment tank 2025E-60C-TK-2	304 SS	Metric	14,400	2.4	3.6	0.64
		Standard	3,800	8	12	1/4
Verification tanks 2025E-60H-TK-1A 2025E-60H-TK-1B 2025E-60H-TK-1C	Carbon steel with epoxy lining	Metric	3,025,739	18.3	11.4	0.79
		Standard	799,316	60	37	5/16
Secondary waste receiving tanks 2025E-60I-TK-1A 2025E-60I-TK-1B	304 SS	Metric	73,800	4.3	5.7	0.64
		Standard	19,500	14	18.7	1/4

Concentrate tanks 2025E-60J-TK-1A 2025E-60J-TK-1B	316L SS	Metric	24,900	3.0	3.8	0.64
		Standard	6580	10	11.5	1/4
Evaporator Vapor Body Vessel 2025E-60I EV 1	Alloy 625	Metric	20,000	2.4	6.8	variable
		Standard	5300	8	22	
Distillate flash tank 2025E-60I-TK-2	304 SS	Metric	950	0.76	Length 2.2	0.7
		Standard	250	2.5	7	9/32
Sump Tank 1 2025E-20B-TK-1	304 SS	Metric	6,900	1.5 x 1.5	3.4	0.48
		Standard	1,800	5 X 5	11	3/16
Sump Tank 2 2025E-20B-TK-2	304 SS	Metric	6,700	1.5 x 1.5	3.4	0.48
		Standard	1,770	5 X 5	11	3/16

[1]Type 304 SS, 304L, 316 SS and alloy 625 provide corrosion protection.
[2]The maximum tank capacity is identified in CHPRC-01900, Revision 2
[3]The nominal thickness of 200 Area ETF tanks is represented.
304 SS = stainless steel type 304 or 304L.
316L SS = stainless steel type 316L
FRP = Fiberglass-reinforced plastic.

1 **Table C.6. 200 Area Effluent Treatment Facility Additional Tank System Information**

Tank Description	Liner Materials	Pressure Controls	Foundation Materials	Structural Support	Seams	Connections
Load-In Station tanks 2025ED-59A-TK-109 2025ED-59A-TK-117	None	vent to atmosphere	concrete slab	SS skirt bolted to concrete	welded	flanged
Load-In Station tank 2025ED-59A-TK-1	None	vent to atmosphere	concrete slab	bolted to concrete	none	flanged
Surge tank 2025E-60A-TK-1	None	vacuum breaker valve/vent to VOG	reinforced concrete ring plus concrete slab	structural steel on concrete base	welded	flanged
pH adjustment tank 2025E-60C-TK-1	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged
First RO feed tank 2025E-60F-TK-l	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged
Second RO feed tank 2025E-60F-TK-2	None	vent to VOG	concrete slab	carbon steel frame	welded	flanged
Effluent pH adjustment tank 2025E-60C-TK-2	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged
Verification tanks 2025E-60H-TK-lA 2025E-60H-TK-1B 2025E-60H-TK-1C	Epoxy	filtered vent to atmosphere	reinforced concrete ring plus concrete slab	structural steel on concrete base	welded	flanged
Secondary waste receiving tanks 2025E-60I-TK-1A 2025E-60I-TK-1B	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged
Concentrate tanks 2025E-60J-TK-1A	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged

2025E-60J-TK-1B						
Evaporator Vapor Body Vessel (2025E 60I EV 1)	None	pressure indicator/pressure relief valve vapor vent to DFT/VOG	concrete slab	carbon steel frame	welded	flanged
Distillate flash tank 2025E-60I-TK-2	None	Pressure relief valve/vent to vent gas cooler/VOG	concrete slab	carbon steel I-beam and cradle	welded	flanged
Sump Tank 1 2025E-20B-TK-1	None	vent to VOG	concrete containment	reinforced concrete containment basin	welded	flanged
Sump Tank 2 2025E-20B-TK-2	None	vent to VOG	concrete containment	reinforced concrete containment basin	welded	flanged

DFT = distillate flash tank
VOG = vessel off gas system

Table C.7. Ancillary Equipment and Material Data

System	Ancillary Equipment	Number	Material
Load-In Station tanks	Load-In Station/transfer pumps (2)	2025ED-P-103A/-103B	316 SS
		2025ED-P-001A/-001B	Cast iron
	Load-In Station filters (6)	59A-FL-001/-002/-003/ -004/-005/-006	304 SS
Surge tank	Surge tank pumps (3)	2025E-60A-P-1A/-1B/-1C	304 SS
Rough filter	Rough filter	2025E-60B-FL-1	304 SS
UV/OX	UV oxidation inlet cooler	2025E-60B-E-1	316 SS
	UV oxidizers (4)	2025E-60D-UV-1A/-1B/-2A/-2B	316 SS
pH adjustment	pH adjustment pumps (2)	2025E-60C-P-1A/-1B	304 SS
Peroxide decomposer	H2O2 decomposers (2)	2025E-60D-CO-1A/-1B	CS with epoxy coating
Fine filter	Fine filter	2025E-60B-FL-2	304 SS
Degasification	Degasification column inlet cooler	2025E-60E-E-1	316 SS
	Degasification column	2025E-60E-CO-1	FRP
	Degasification pumps (2)	2025E-60E-P-1A/-1B	316 SS
RO	Feed/booster pumps (6)	2025E-60F-P-1A/-1B/-2A/-2B/-3A/-3B	304 SS
	Reverse osmosis arrays (21)	2025E-60F-RO-01 through -21	Membranes: polyamide Outer piping: 304 SS
IX/Polishers	Polishers (3)	2025E-60G-IX-1A/-1B-1C	CS with epoxy coating
	Resins strainers (3)	2025E-60G-S-1A/-1B/-1C	304 SS
Effluent pH adjustment	Recirculation/transfer pumps (2)	2025E-60C-P-2A/-2B	304 SS/PVC
Verification tanks	Return pump	2025E-60H-P-1	304 SS
	Transfer pumps (2)	2025E-60H-P-2A/-2B	
Secondary waste receiving tanks	Secondary waste feed pumps (2)	2025E-60I-P-1A/-1B	304 SS
Evaporator Vapor Body Vessel system	Feed/distillate heat exchanger	2025E-60I-E-02	Tubes: 316 SS Shell: 304 SS
	Heater (reboiler)	2025E-60I-E-01	Tubes: alloy 625 Shell: 304 SS
	Recirculation pump	2025E-60I-P-02	316 SS
	Concentrate transfer pump	2025E-60I-P-04	316 SS
	Entrainment separator	2025E-60I-DE-01	Top section: 316 SS Bottom section: alloy 625

	Vapor compressor (incl. silencers)	2025E-60I-C-01	304 SS
	Silencer drain pump	2025E-60I-P-06	316 SS
	Level control tank	2025E-60I-TK-5	304 SS
	Distillate flash tank pump	2025E-60I-P-03	316 SS
Concentrate tanks	Concentrate circulation pumps (2)	2025E-60J-P-1A/-1B	316 SS
Thin film dryer	Concentrate feed pump	2025E-60J-P-2	316 SS
	Thin film dryer	2025E-60J-D-1	Interior surfaces: alloy 625 Rotor and blades: 316 SS
	Powder hopper	2025E-60J-H-1	316 SS
	Spray condenser	2025E-60J-DE-01	316 SS
	Distillate condenser	2025E-60J-CND-01	Tubes: 304 SS Shell: CS
	Dryer distillate pump	2025E-60J-P-3	316 SS
Resin dewatering	Dewatering pump	2025E-80E-P-1	

Table C.8. Concrete and Masonry Coatings

Location	Product Name	Applied Film Thickness, Estimated	
		Mils	Inches
2025-E Process Area, Truck Bay, and Container Storage Areas			
Floor: Topcoat	Chemproof PermaCoat 4000[1]	2 coats at 12-16 mils	0.012 0.016 inches
Walls to 7 feet, Doors & Jambs	Chemproof PermaCoat 4000 Vertical[1]	2 coats at 12-16 mils	0.012-0.016 inches
Load-In Station Tank Pit			
Floor and Walls Topcoat	Elasti Liner I/II[2,3]	80 mils	0.08 inches
Floor and Walls: Primer	Techni-Plus E[2]	5-7 mils	0.005-0.007 inches
Surge Tank and Verification Tank Berms			
Floors (and Walls at Surge Tank): Topcoat	Elasti-Liner I[2]	80 mils	0.08 inches
Floors (and Walls at Surge Tank): Primer	Techni-Plus E3[2]	5.0-7.0 mils	0.005 0.007 inches

[1]PermaCoat is a trademark of Chemproof Polymers, Inc.
[2]Elasti-Liner and Techni-Plus are trademarks of KCC Corrosion Control, Inc.
[3]Elasti-Liner I or a combination of Elasti-liner I and Elasti-liner II

Table C.9. Geomembrane Material Specifications

Property	Value
Specific gravity	0.932 to 0.950
Melt flow index	gram/10 minutes, maximum (0.04 ounce/10 minute, maximum)
Thickness (thickness of flow marks shall not exceed 200 percent of the nominal liner thickness)	60 mil ±10% (1.5 millimeter [0.06 inches] ± 10%)
Carbon black content	1.8 to 3%, bottom liner 2 to 3% top liner
Tensile properties (each direction)	
Tensile strength at yield	21.5 kgf/centimeter width, minimum 120 pounds/inch width, minimum
Tensile strength at break	32.2 kgf/centimeter width, minimum 180 pounds/inch width, minimum
Elongation at yield	10%, minimum
Elongation at break	500%, minimum
Tear resistance	13.6 kgf, minimum 30 pounds, minimum
Puncture resistance	31.3 kgf, minimum 69 pounds, minimum
Low temperature/brittleness	-400 C (-688°F), maximum
Dimensional percent change each direction)	±2%, maximum
Environmental stress crack	750 hour, minimum
Water absorption	0.1% maximum and weight change
Hydrostatic resistance	316,000 kgf/meter^2 450 pounds/inch^2
Oxidation induction time (200 C/l atm. O_2)	90 minutes

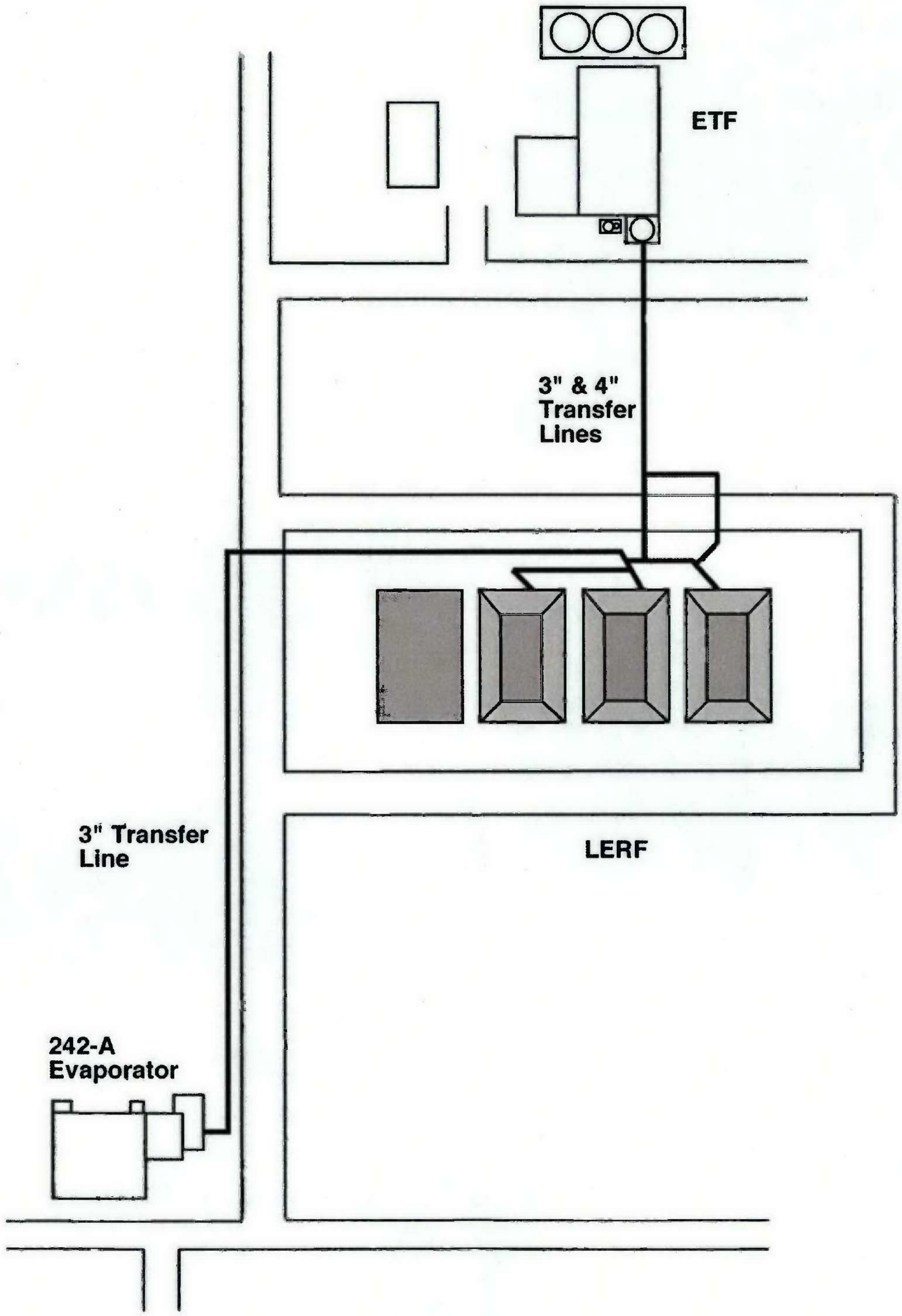
Reference: *Construction Specifications for 242-A Evaporator and PUREX Interim Retention Basins* (W 105, KEH 1990). Format uses NSF 54 table for high-density polyethylene as a guide (NSF 1985). However, RCRA values for dimensional stability and environmental stress crack have been added.

kgf = kilograms force

Table C.10. Drainage Gravel Specifications

Property	Value
Sieve Size	
25 millimeters (1 inches)	100 wt.% passing
19 millimeters (0.75 inches)	80 – 100 wt.% passing
9.5 millimeters (0.375 inches)	10 – 40 wt.% passing
4.75 millimeters (0.187 inches)	0 – 4 wt.% passing
Permeability	0.1 centimeters (0.04 inches)/second, minimum

Reference: Sieve size is from WSDOT M41-10-88, Section 9.03.1(3)C for Grading No. 5 (WSDOT 1988). Permeability requirement is from WAC 173-303-650(2)(j) for new surface impoundments.



ETF = Effluent Treatment Facility
LERF = Liquid Effluent Retention Facility

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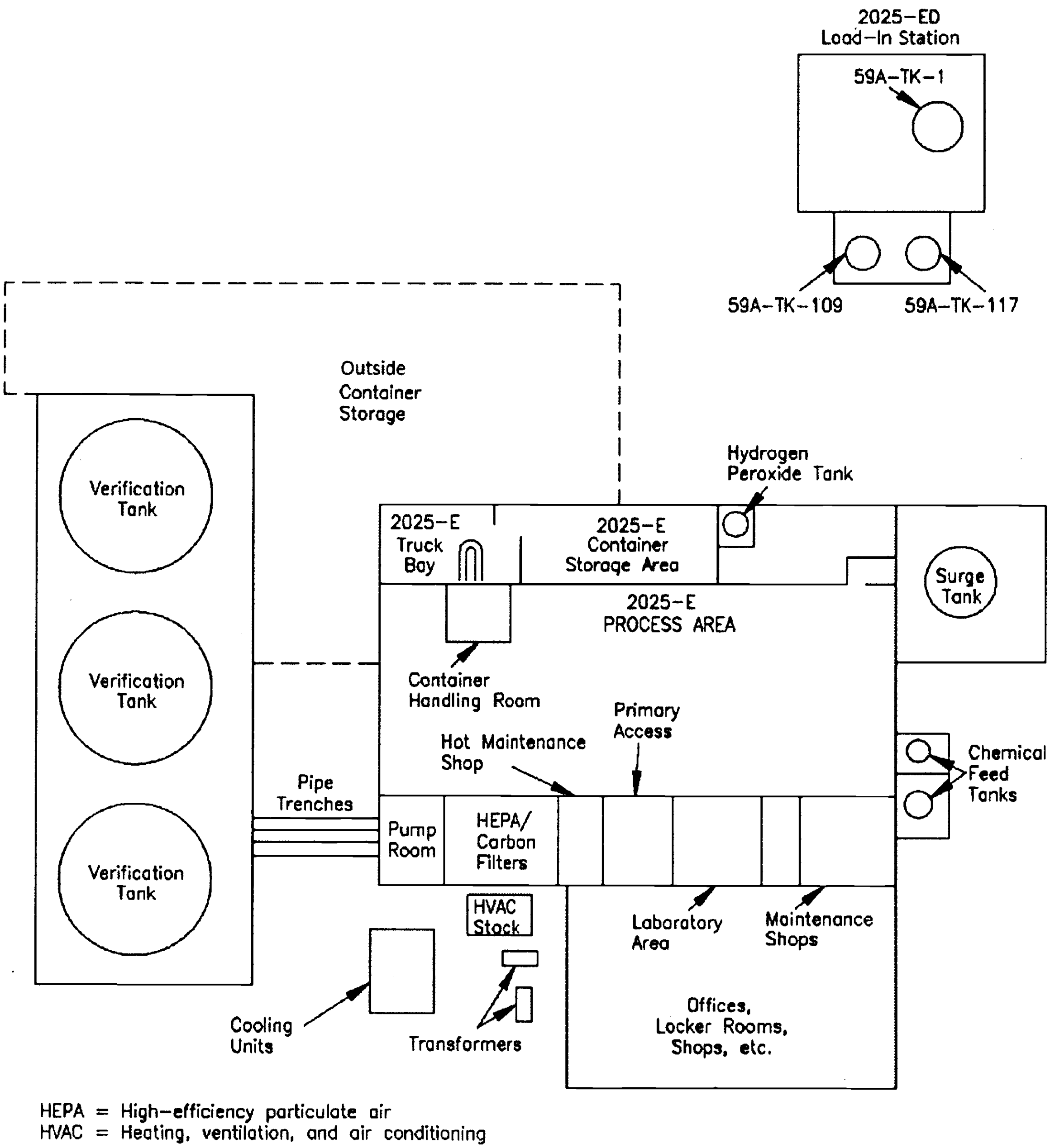
Figure C.1. Liquid Effluent Retention Facility Layout



1 **Figure C.2. Plan View of the 200 Area Effluent Treatment Facility**

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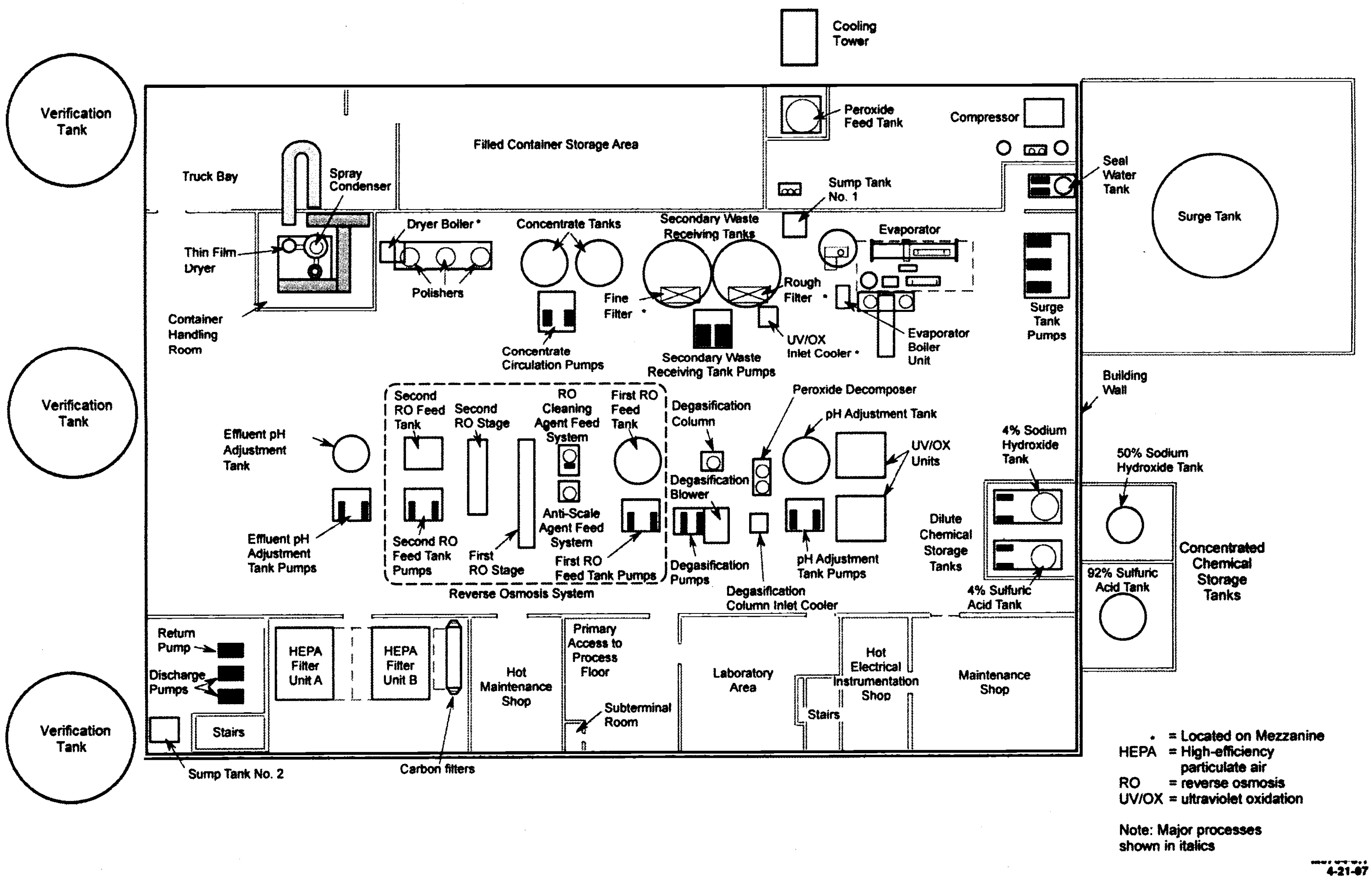
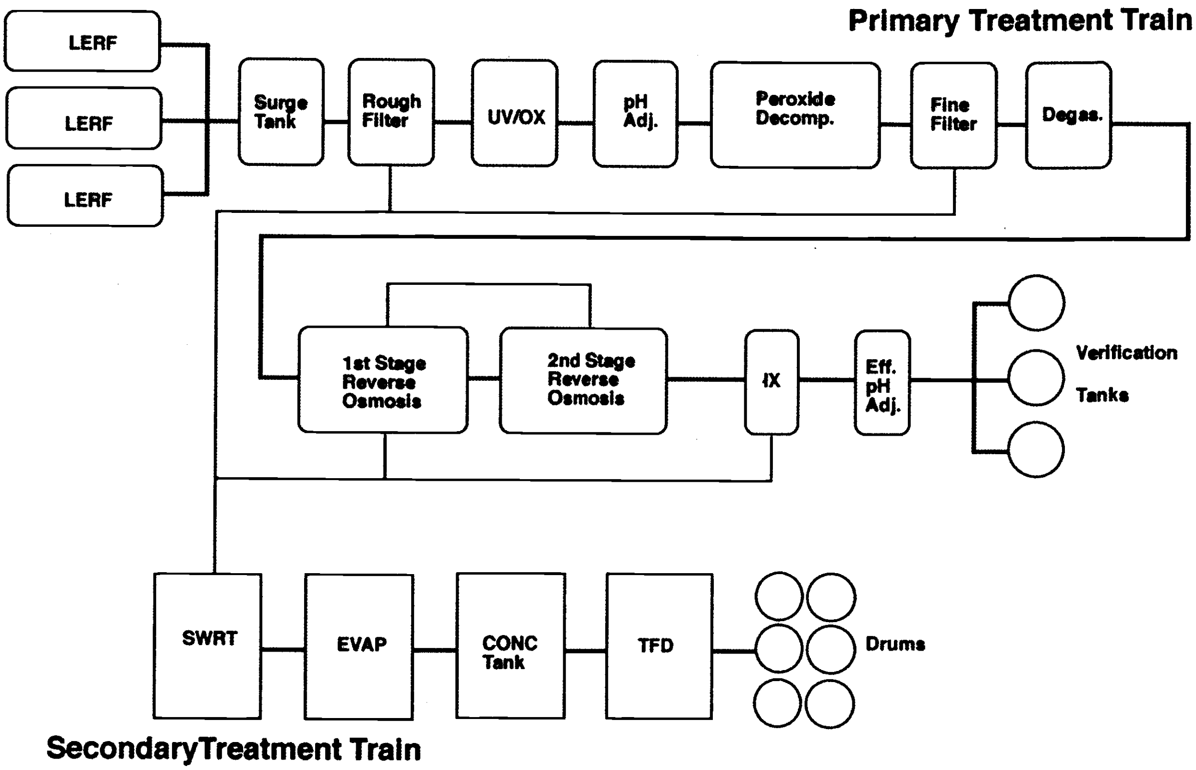


Figure C.3. Building 2025-E Ground Floor Plan



CONC Tank = Concentrate tank
Degas. = Degasification column
Eff. pH Adj. = Effluent pH adjustment tank
EVAP = Evaporator
IX = Ion Exchange
LERF = Liquid Effluent Retention Facility
pH Adj. = pH adjustment tank
SWRT = Secondary waste receiving tank
TFD = Thin film dryer
UV/OX = Ultraviolet Oxidation

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4-21-07

Figure C.4. Example - 200 Area Effluent Treatment Facility Configuration 1

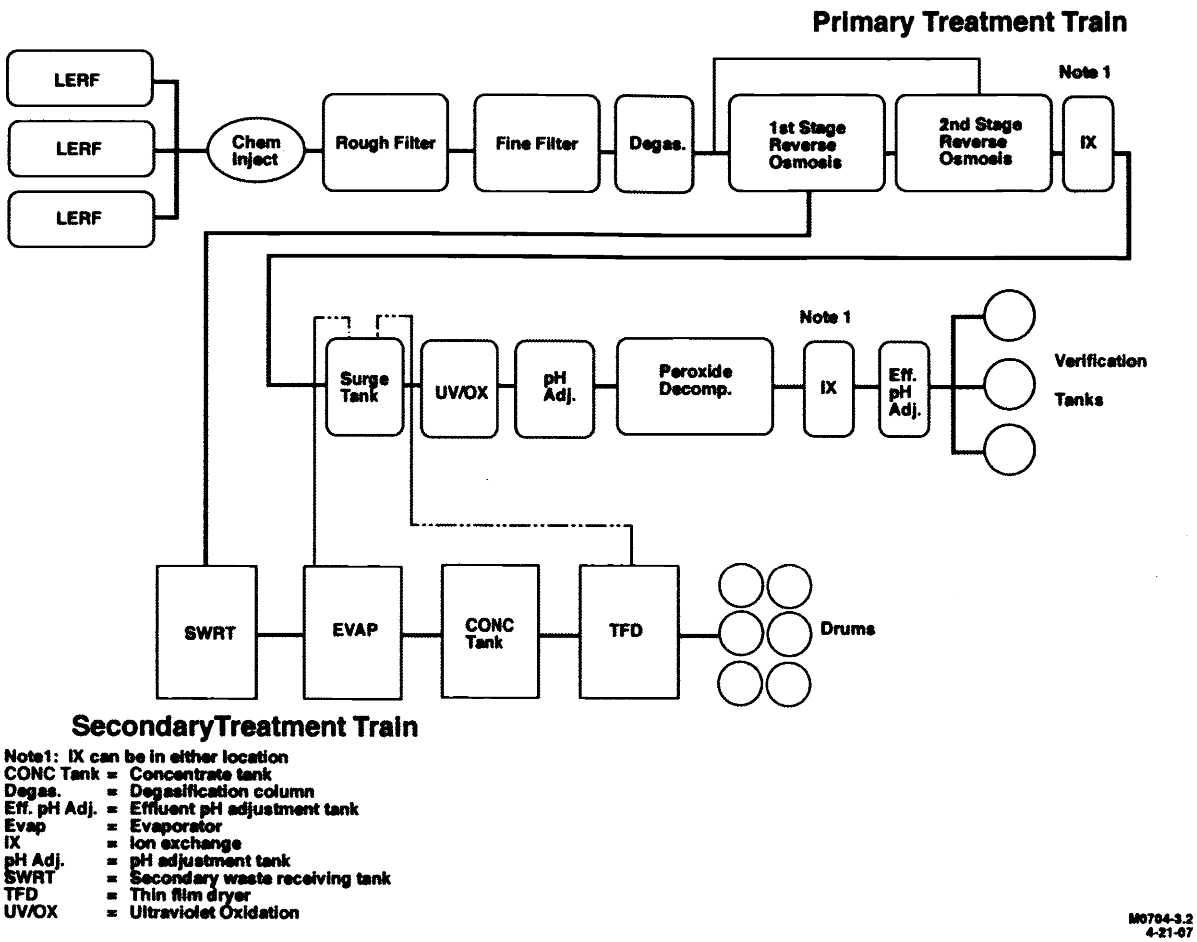


Figure C.5. Example - 200 Area Effluent Treatment Facility Configuration 2

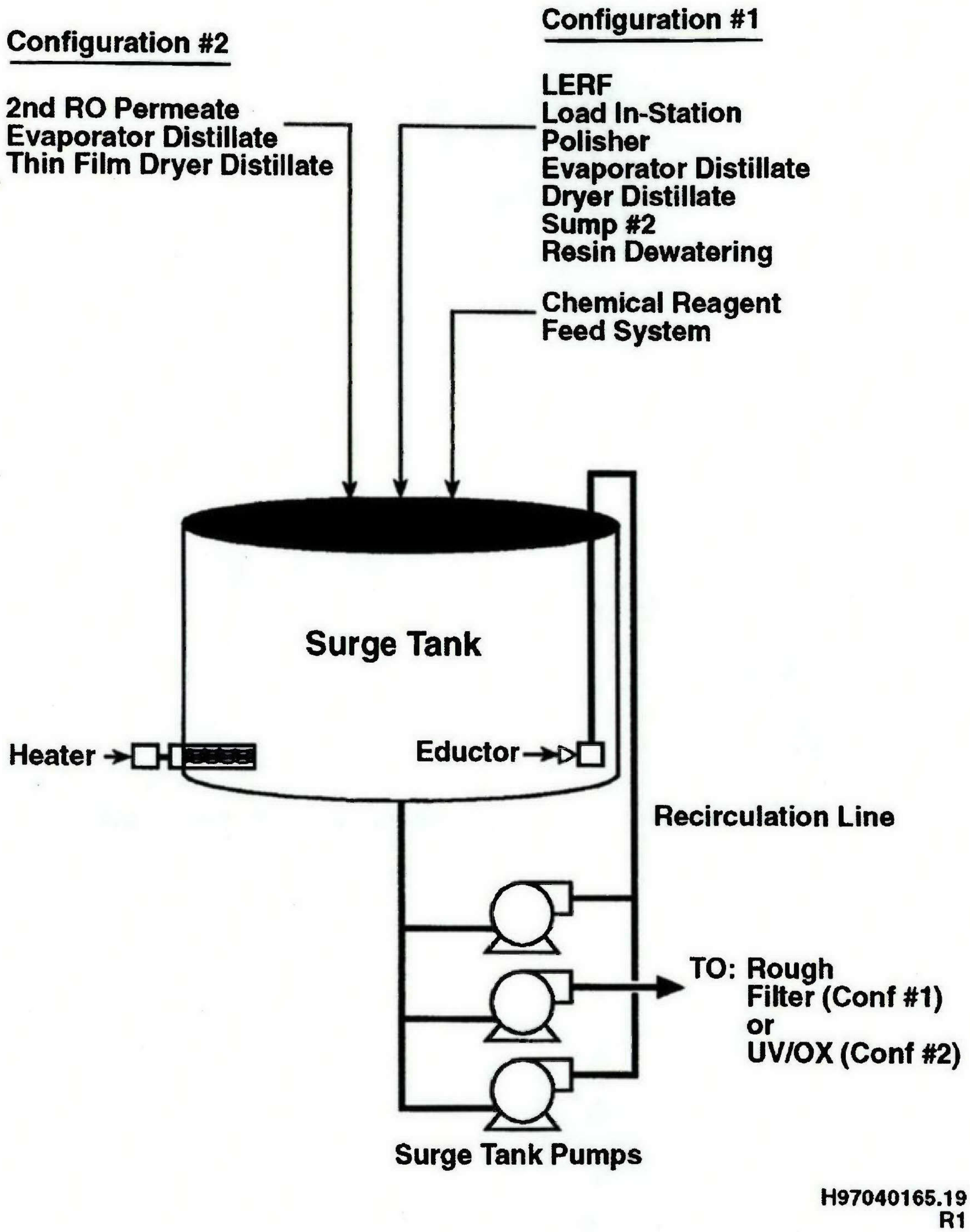
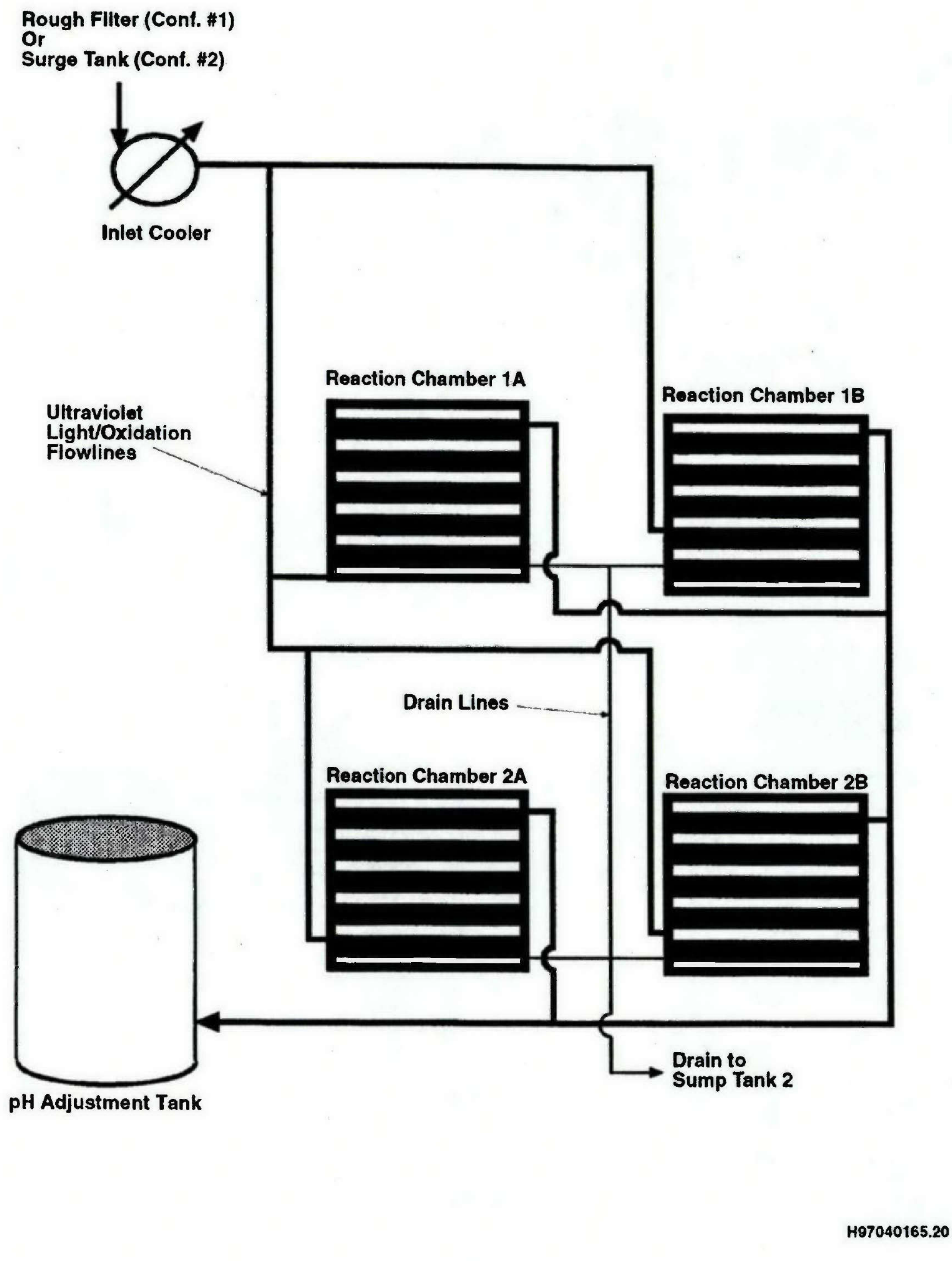


Figure C.6. Surge Tank



1 **Figure C.7. Ultraviolet Light/Oxidation Unit**

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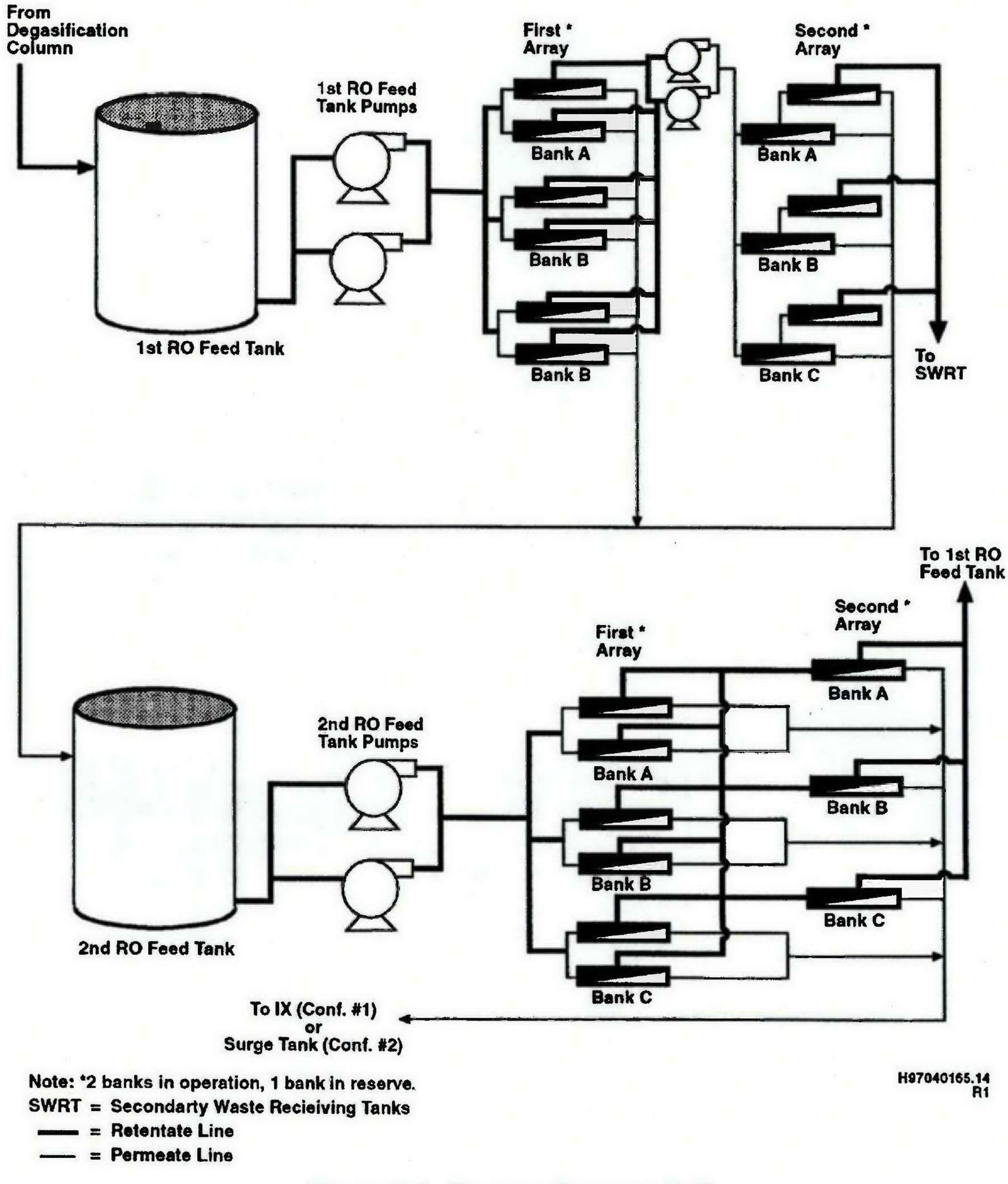
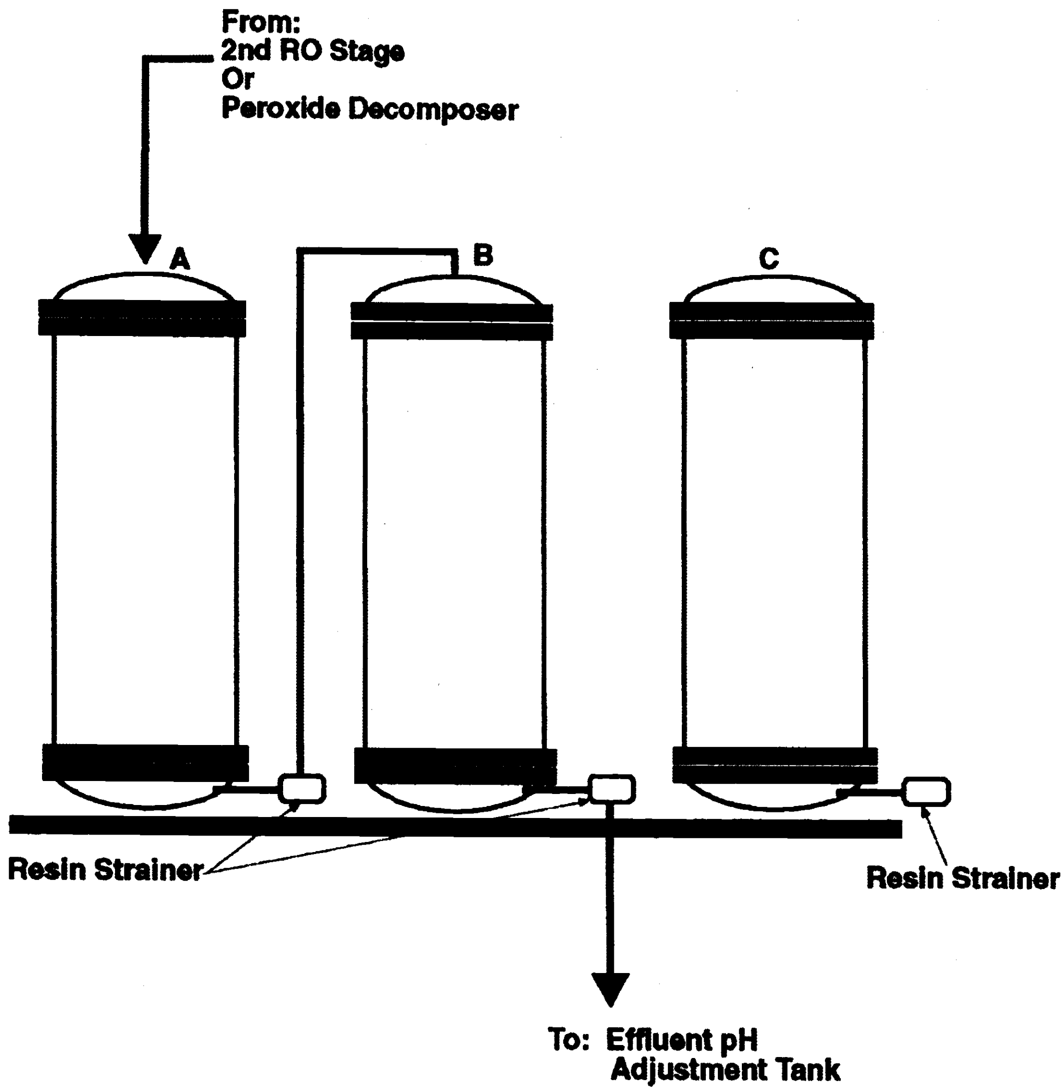


Figure C.8. Reverse Osmosis Unit



NOTE: Example Configuration- Column A and B in Operation, Column C in Standby Mode

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Figure C.9. Ion Exchange Unit

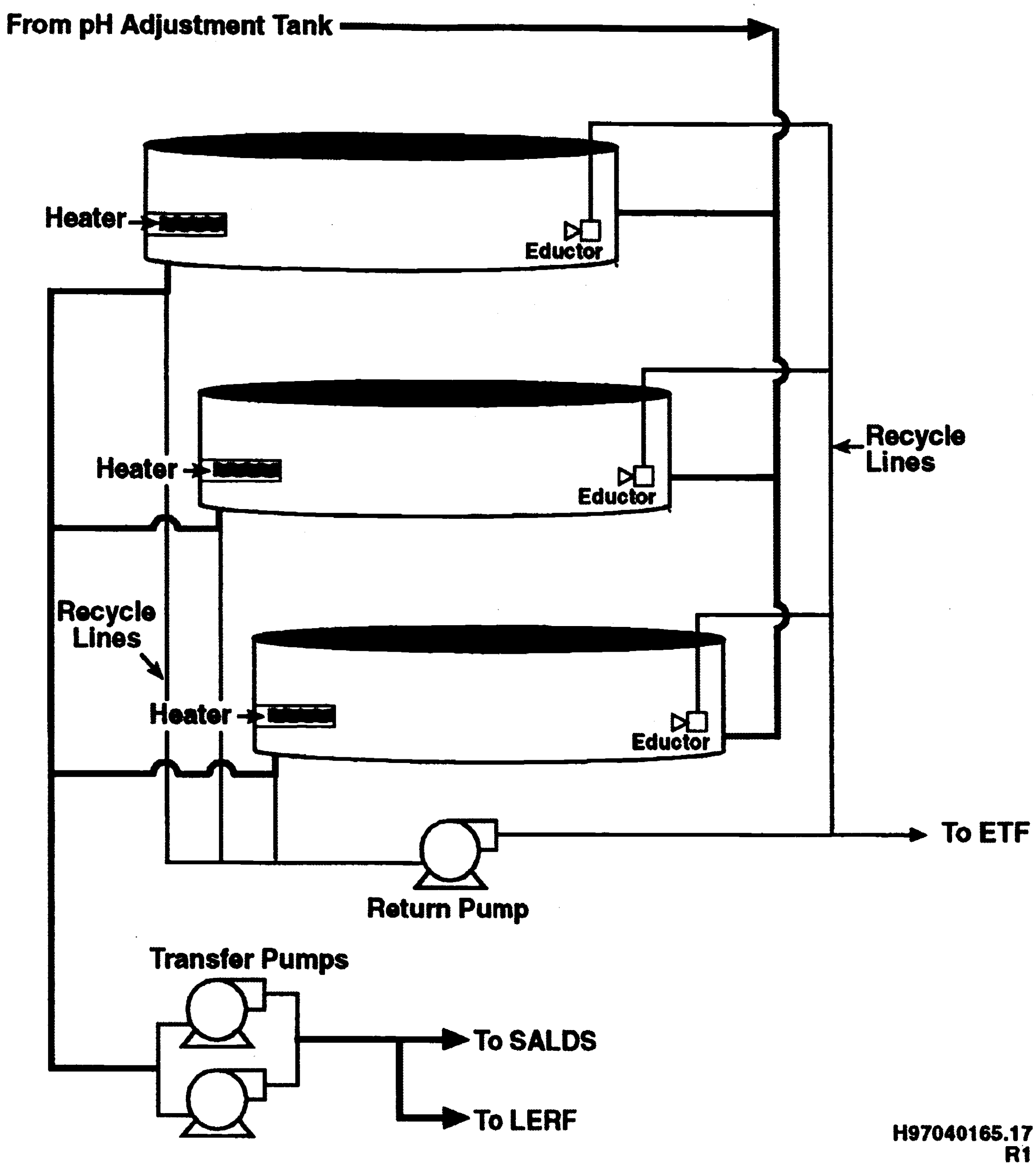
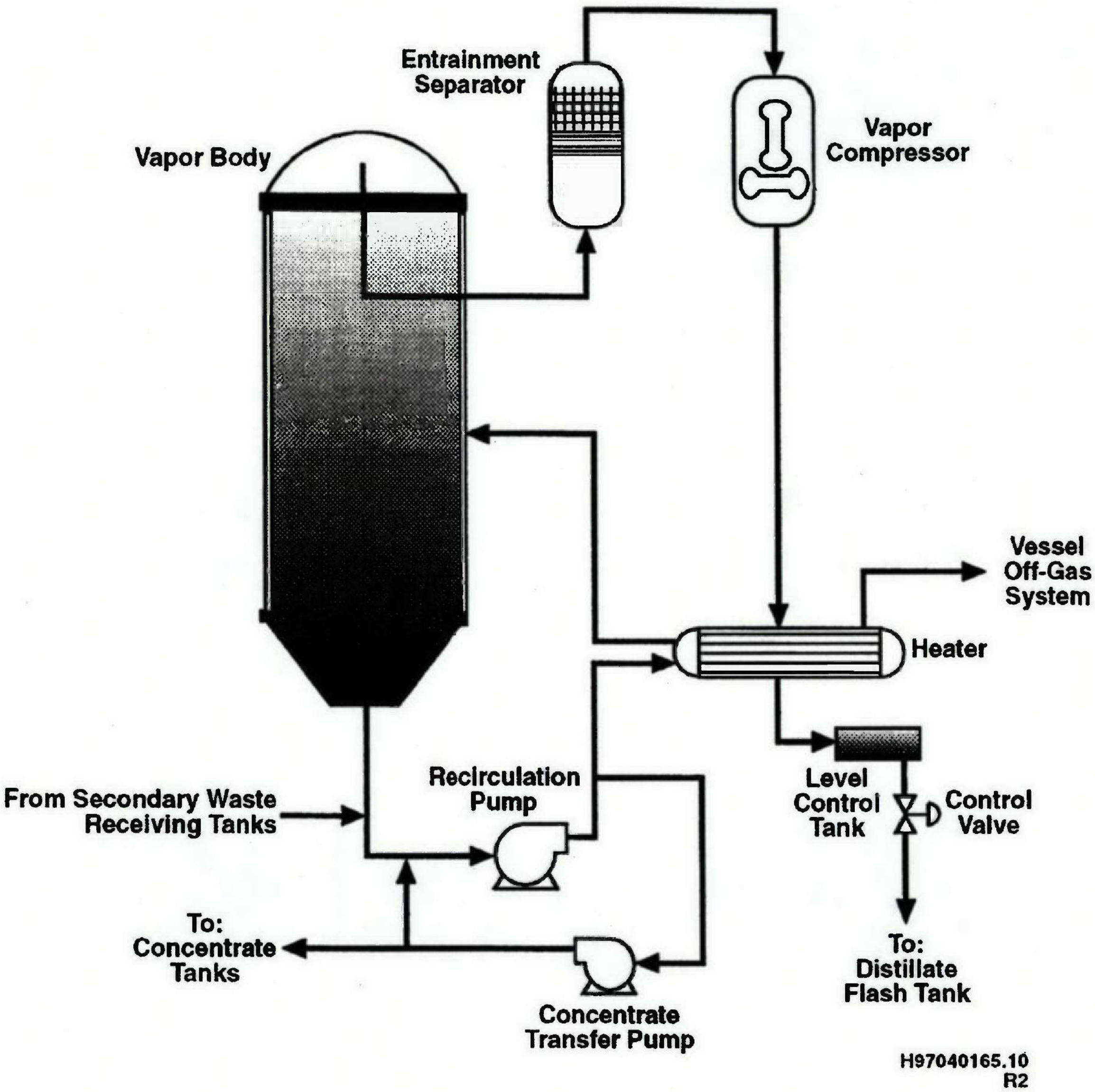


Figure C.10. Verification Tanks



1 Figure C.11. 200 Area Effluent Treatment Facility Evaporator

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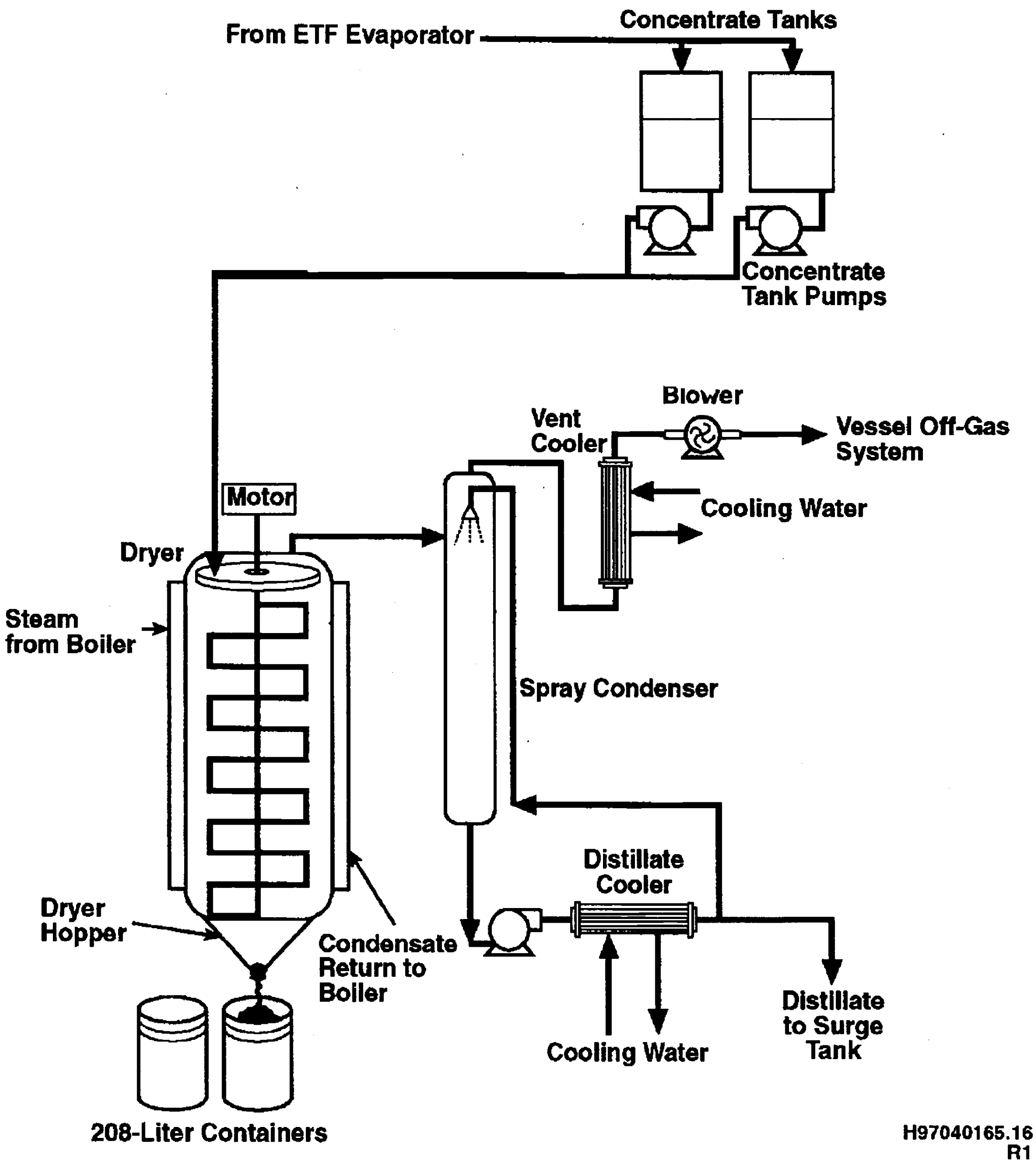
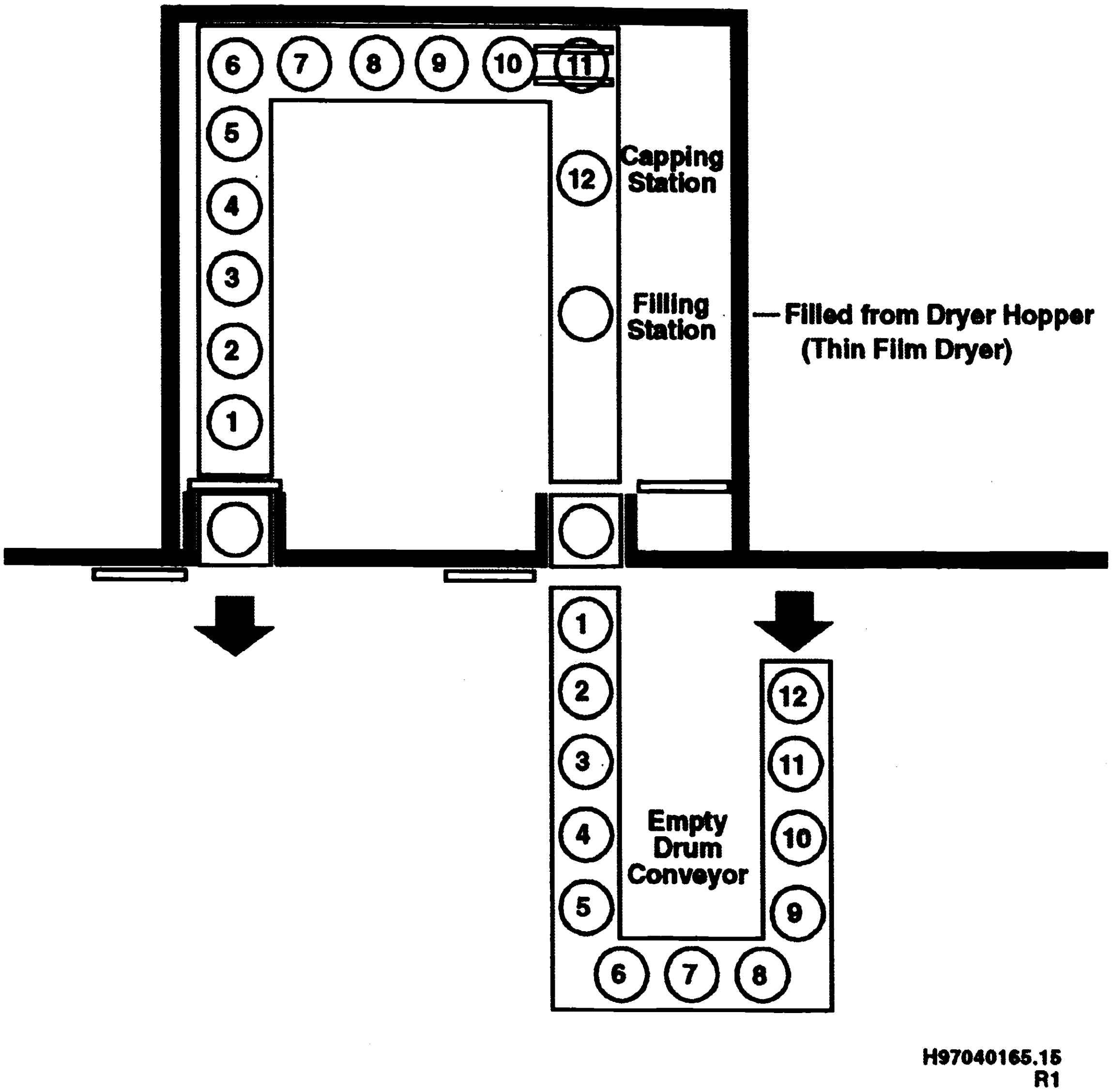


Figure C.12. Thin Film Dryer



1 **Figure C.13. Container Handling System**

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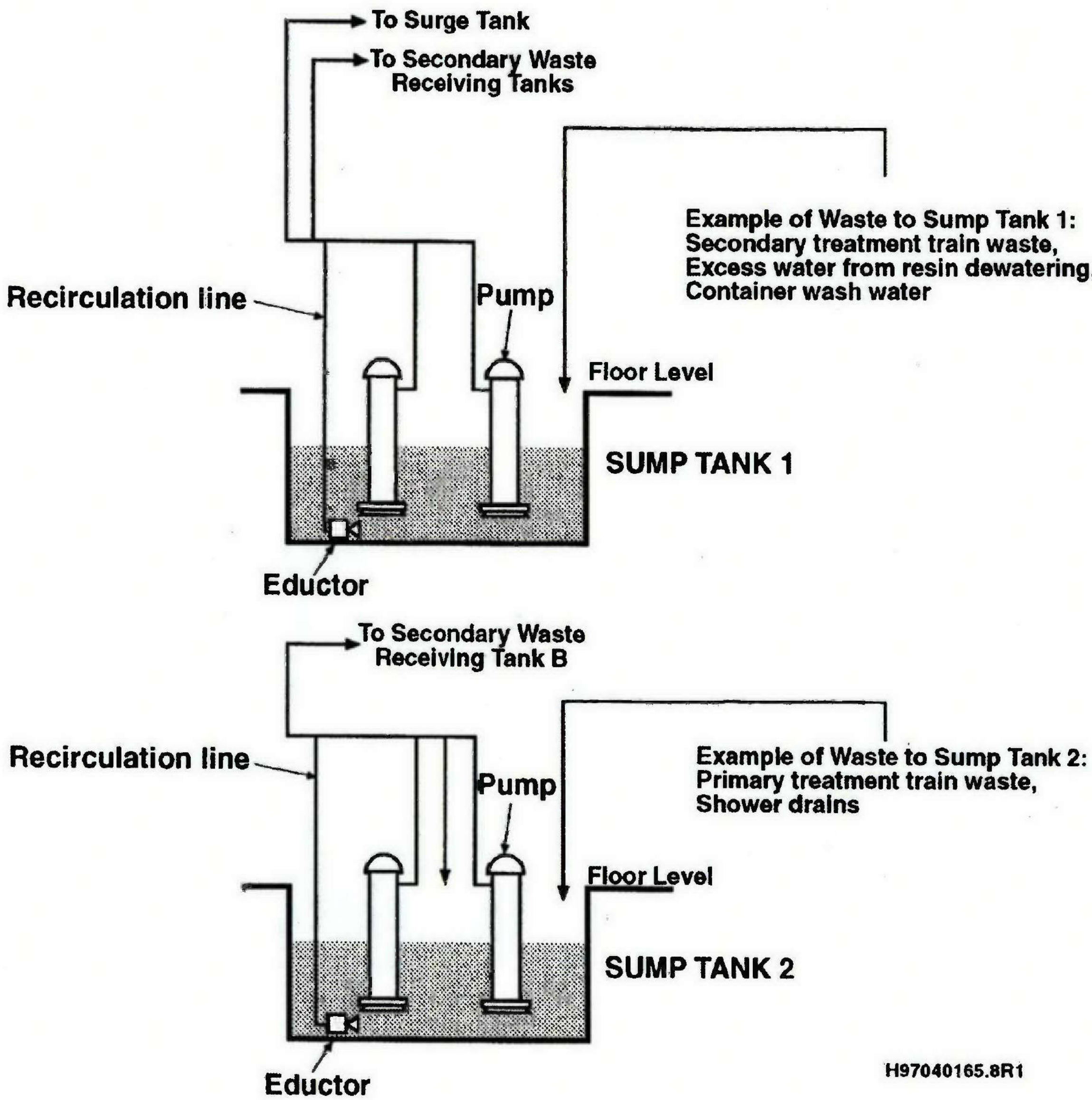
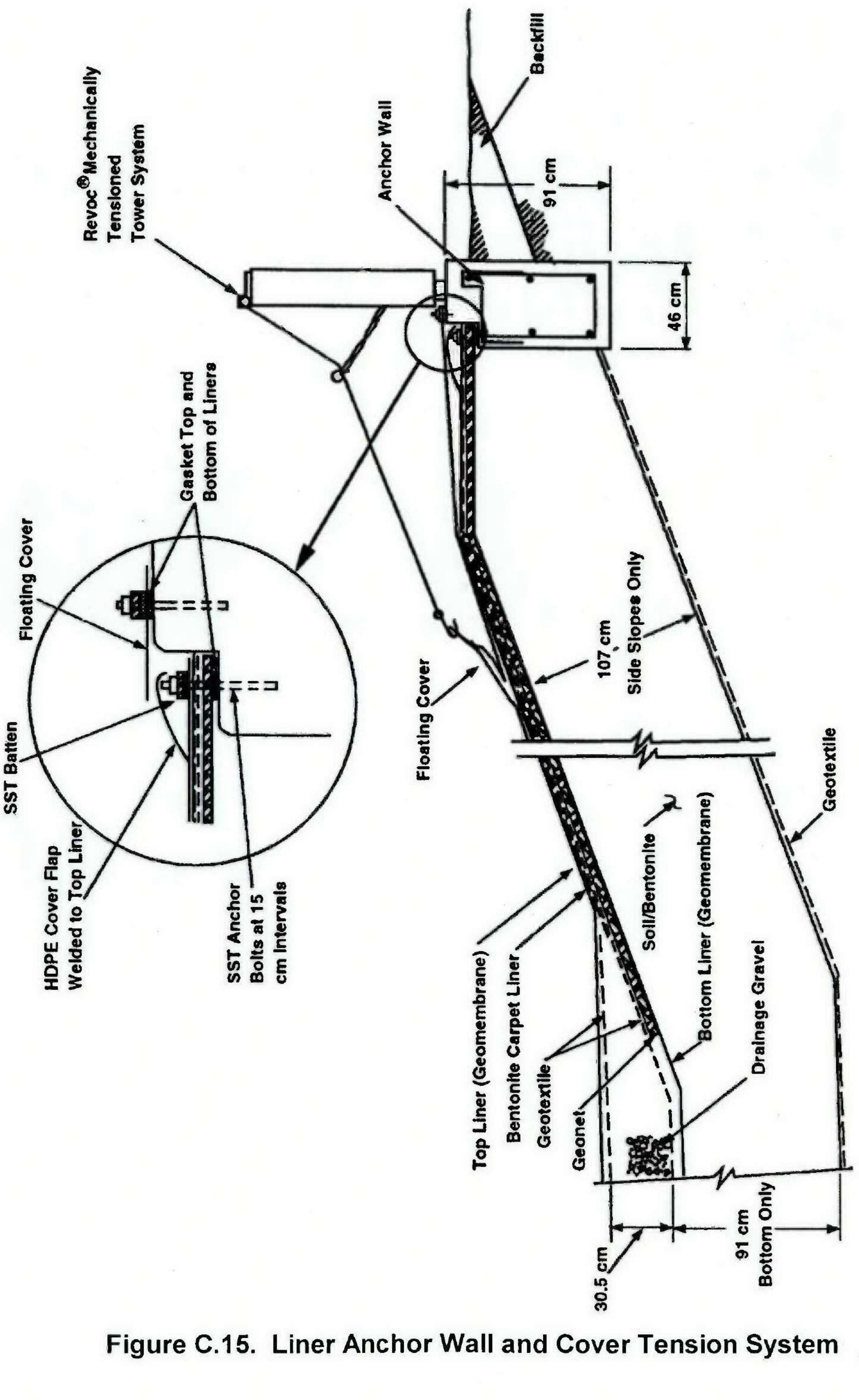


Figure C.14. 200 Area Effluent Treatment Facility Sump Tanks



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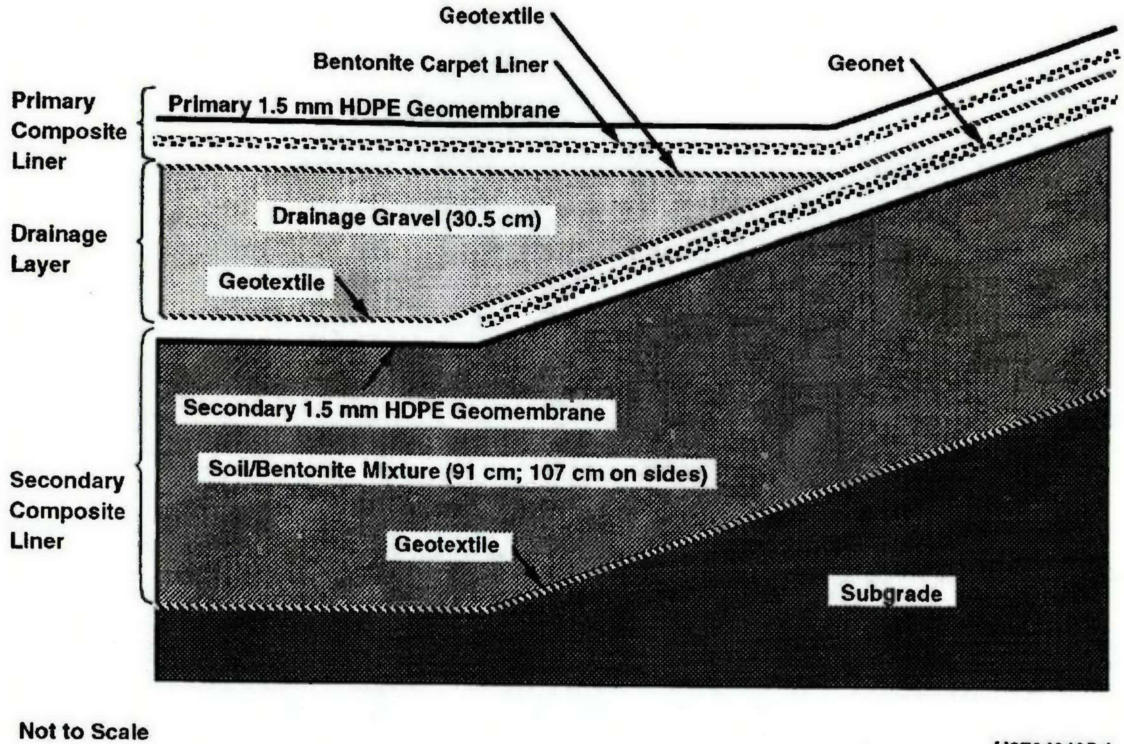
Not to Scale

Figure C.15. Liner Anchor Wall and Cover Tension System



1 **Figure C.16. Liner System Schematic**

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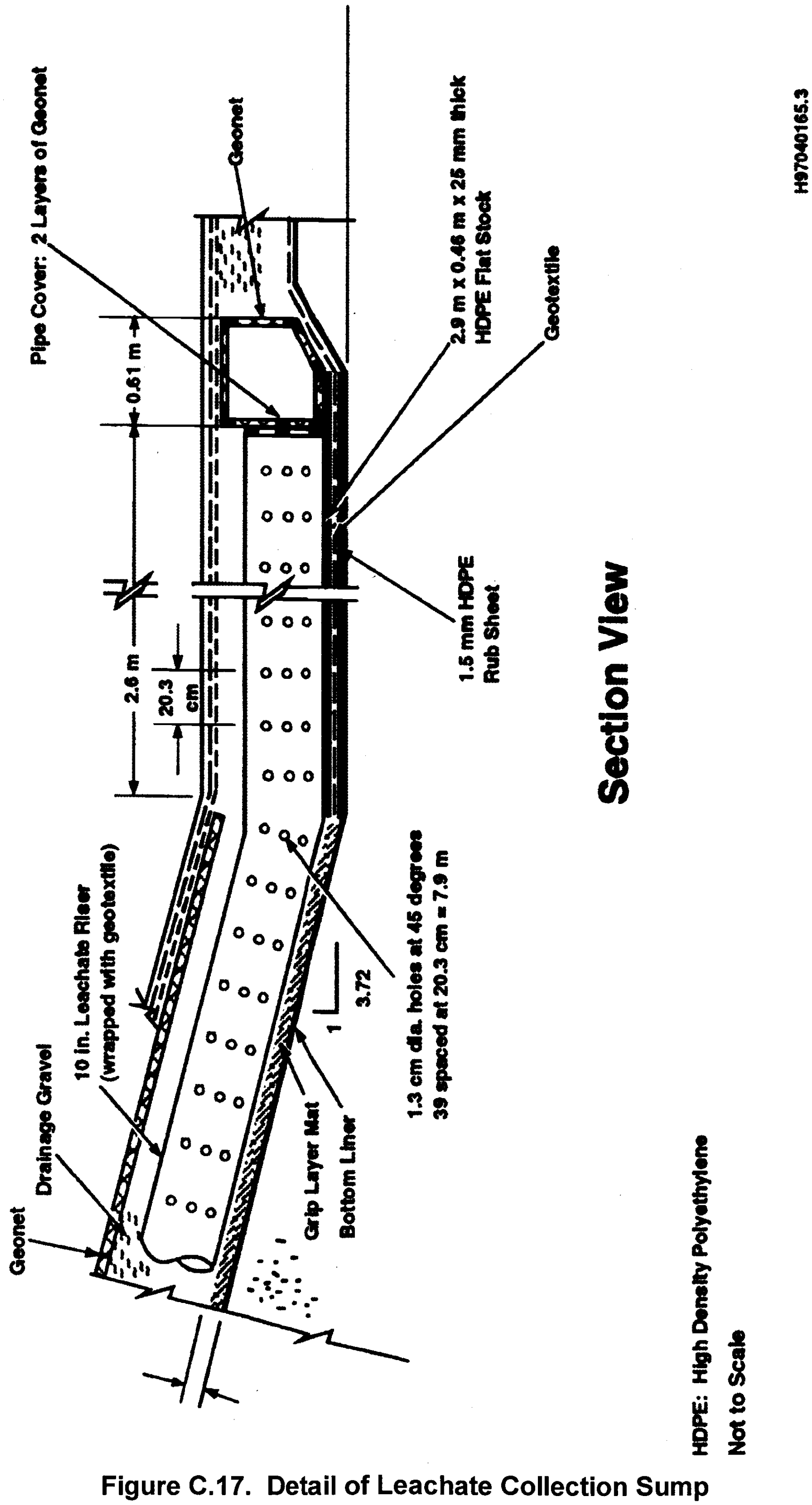

Figure C.17. Detail of Leachate Collection Sump

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ADDENDUM F
PREPAREDNESS AND PREVENTION

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ADDENDUM F
PREPAREDNESS AND PREVENTION

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F. PREPAREDNESS AND PREVENTION

F.1 Preparedness and Prevention Requirements

The following sections document the preparedness and prevention measures taken at the Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF).

F.1.1 Equipment Requirements

The following sections describe the internal and external communications systems and the emergency equipment required that could be activated by the LERF and 200 Area ETF Building Emergency Director (BED).

F.1.1.1 Internal Communications

When operators are present at the LERF, the operators carry two-way radios to maintain contact with 200 Area ETF personnel. The operators at LERF are informed of emergencies (e.g., building and/or area evacuations, take-cover events, high airborne contamination, fire, and/or explosion), and are provided with emergency instructions by several systems. These systems include the mobile two-way radios, and the telephone in the LERF instrument building.

The 200 Area ETF is equipped with an internal communication system to provide immediate emergency instruction to personnel. The onsite communication system at the 200 Area ETF includes telephones, mobile two-way radios, a public address system, and alarm systems. The telephone and radio systems provide for internal and external communication. Alarm systems exist to allow personnel to respond appropriately to various emergencies, including building evacuations, take cover events, and fire and/or explosion. Addendum J provides additional information on the response activities.

F.1.1.2 External Communications

The LERF and its operators are equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hazardous Materials Response Team, and/or Hanford patrol, as necessary. External communication to summon emergency assistance is made by a normal telephone system or mobile two-way radios. The LERF telephone is available in the instrumentation building. The 200 Area ETF uses fire alarm pull boxes and telephones for external communication and are located at numerous locations throughout the 200 Area ETF.

F.1.1.3 Emergency Equipment

The LERF and 200 Area ETF rely primarily on the Hanford Fire Department to respond to fires and other emergencies as described in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02). All LERF and 200 Area ETF operators are familiar with the LERF and 200 Area ETF contingency plans (Addendum J) and are trained in the use of emergency pumping of LERF and 200 Area ETF systems, fire, and communications equipment.

Portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment is available at various locations in the 200 Area ETF.

The 200 Area ETF has fire extinguishers, automatic fire suppression systems (200 Area ETF Control Room and electrical room), fire alarm pull boxes, and a water spray system (200 Area ETF operating and administrative portions).

Respirators, hazardous material protective gear, and special work procedure clothing for 200 Area ETF personnel are kept in the change room at the 200 Area ETF. Safety showers are located in convenient locations in the 200 Area ETF, and emergency eyewashes are available for use. Water for these devices is supplied from the 200 Area ETF sanitary water system.

F.1.1.4 Water for Fire Control

A water main is not provided to the LERF. The Hanford Fire Department is equipped with fire engines for fire control for fires requiring high water volume and pressure. The 200 Area ETF is serviced by two 12-inch raw water lines that are tied into the 200 East Area raw water distribution grids. These lines provide a looped configuration that supplies two independent sources of raw water for fire protection and raw water uses. Connections from the 200 Area ETF raw water system supply fire hydrants and the wet pipe sprinkler system. In the event that water pressure is lost, the Hanford Fire Department is equipped with fire engines to provide needed water.

F.1.2 Aisle Space Requirement

The operation of the LERF does not involve aisle space. Nevertheless, the LERF and the individual basins are easily accessible to emergency response personnel and vehicles. A 6.1-meter (20-feet)-wide service road runs along the base of the basin area on the east, south, and west sides within the operational security fence.

Aisle spacing at 200 Area ETF is sufficient to allow the movement of personnel and fire protection equipment in and around the containers. This storage arrangement also meets the requirements of the National Fire Protection Association (NFPA 1996) for the protection of personnel and the environment. A minimum 76-centimeter (30-inch) aisle space is maintained between rows of containers as required by WAC 173-303-630(5)(c).

F.2 Preventive Procedures, Structures, and Equipment

The following sections describe preventive procedures, structures, and equipment.

F.2.1 Unloading Operations, Spill Prevention, and Control

Underground pipelines that transfer aqueous waste to and from the LERF are encased in a secondary pipe. If a leak is detected in a pipeline, flow in the pipeline will be stopped and the cause of the leak investigated and remediated.

If it is required to transfer aqueous waste from one LERF basin to another, existing transfer pumps are used as described in Addendum C.

The 2025-ED Load-in Station is monitored continuously during tank-filling operations and filling is stopped immediately if leaks occur. Care is taken to ensure that even minor leaks are cleaned up immediately and disposed of in accordance with approved management procedures. Any spill that is determined to be a dangerous waste will be managed according to the requirements of WAC 173-303.

F.2.2 Runoff

The LERF is constructed and operated to ensure that all aqueous waste is contained within the basins. The basins are designed and operated to prevent overtopping. Furthermore, the basins are provided with very low-density polyethylene floating covers to prevent the introduction of precipitation into the basins. The basins also are graded to ensure that all precipitation outside the basins is directed away from the surface impoundments.

The basins are constructed so that the top of the basin dikes are approximately 3 meters (9.8 feet) above grade. The exterior side slopes of the basins have a 2.25 (horizontal) to 1 (vertical) slope. Run-on of precipitation to the basins from the surrounding area is not possible because the surrounding area slopes away from the LERF.

Dangerous waste and hazardous chemical handling areas at the 200 Area ETF are designed to contain spills, leaks, and wash water, thereby preventing run-off and subsequent releases. All dangerous and/or mixed waste loading and unloading areas are provided with secondary containment structures as described in Addendum C, Process Information.

F.2.3 Water Supplies

The LERF uses operating practices, structures, and equipment to prevent the contamination of natural water supplies (i.e., groundwater and surface water). The LERF is monitored continuously in the 200 Area ETF Control Room during liquid waste transfers and at least daily when waste transfers are not occurring to detect abnormal conditions (e.g., leaks), and regularly inspected to detect equipment and structural deteriorations that could allow possible water supply contamination. The basins are provided with a leachate collection system that is designed to contain any leachate generated. These systems, in conjunction with the double-composite liner system and underlying low permeable clay liner, ensure that should a release occur, the release will be fully contained within the basin configuration and, therefore, water supplies will be protected. Addendum J, Contingency Plan, provides information on procedures that are implemented if a release is detected at the LERF.

There are no drinking water wells near the 200 Area ETF. Therefore, a release would not immediately contaminate drinking water supplies. The 200 Area ETF uses operating practices, structures, and equipment to prevent the contamination of natural water supplies (i.e., groundwater and surface water). The 200 Area ETF is continuously monitored in the 200 Area ETF Control Room during liquid waste processing and/or Load-In Station operations transfer to detect abnormal conditions and at least daily when waste process and/or waste transfer operations are not occurring, and is inspected regularly to detect equipment and structural deteriorations that could allow spills to the environment. Areas in contact with dangerous and/or mixed waste are monitored continuously in the 200 Area ETF Control Room during Load-in Station and/or 200 Area ETF processing operations through a series of level and pressure indicators, leak detection alarms, equipment failure alarms, and control panel readouts. In addition, the 200 Area ETF is inspected regularly for the presence of leaks or other off normal conditions wherever possible (in all areas that can be safely entered).

In addition to detailed operating practices, structures and equipment are used at the 200 Area ETF to prevent contamination of water supplies. The structures and equipment designed to prevent contamination of water supplies are the same as the structures and equipment used to prevent run-off from dangerous and/or mixed waste handling areas.

F.2.4 Equipment and Power Failure

The storage function of the LERF is not affected by loss of power and a temporary loss of power would not pose a threat to the environment. Loss of electrical power would not cause the storage of the waste to be jeopardized. For process condensate transferred from the 242-A Evaporator, appropriate valving procedures are followed to ensure a smooth restart of the flow to the LERF in the event of a power failure at the 242-A Evaporator.

The 200 Area ETF does not have a standby power source. Power to selected lighting, computers, and process controls is configured with an uninterruptible power supply. During partial loss of normal power, the affected pumps and subsystems will be shut down. Complete loss of power to the 200 Area ETF shuts down the entire 200 Area ETF except for the instruments, connected to the uninterruptible power supply. The uninterruptible power supply provides temporary power to some systems to assist in an orderly shutdown of the process in the event power cannot be restored quickly. Redundant pumps allow the process to continue to operate when only one component is out of service.

When power at the 200 Area ETF is lost, the valves assume a fail-safe position to allow the process to remain in a safe shutdown mode until restoration of power. This action allows the operators to perform equipment surveys during shutdown and to confirm that there are no safety issues because the 200 Area ETF is shut down. Because a power failure would also shutoff flow into the 200 Area ETF, there will not be any increase in volume in any of the holdup basins, tanks, or other systems.

A combination of reliability, redundancy, maintenance, and repair features are used in the 200 Area ETF equipment and systems to minimize random failure of equipment. For crucial systems such as ventilation filters, redundant trains are provided to mitigate equipment and system failure. Spare parts are maintained for essential production and safety equipment.

F.2.5 Personnel Exposure

At the LERF and 200 Area ETF, operating practices, structures, and equipment are used to prevent undue exposure of personnel to dangerous and/or mixed waste. All personnel handling waste use protective clothing and equipment. All operations are conducted so that exposure to dangerous and/or mixed waste and hazardous materials are maintained as low as reasonably achievable (ALARA).

Protective clothing and equipment are prescribed for personnel handling chemicals or dangerous waste. Before the start of any operation that could expose personnel to the risk of injury or illness, a review of the operation is performed to ensure that the nature of hazards that might be encountered is considered and appropriate protective gear is selected. Personnel are instructed to wear personal protective equipment in accordance with training, posting, and instructions.

A change trailer at LERF is located between Basins 42 and 43. In addition, the change trailer has an operations office for working with procedures. Exits within the change trailer are clearly marked. A storage building is located within the perimeter fence, northwest of the basins. The LERF storage building also is provided with separate storage areas for clean and contaminated equipment. A decontamination shower and decontamination building is located at the 272-AW Building, approximately 1.6 kilometers (1 mile) from the LERF or at the 200 Area ETF.

The 200 Area ETF has eyewash stations and safety showers in convenient locations for use by personnel. The following structures and equipment were incorporated into the 200 Area ETF design to minimize personnel exposure.

- Offices, 200 Area ETF Control Room, clean- and soiled-clothes storage areas, change rooms, and the lunchroom are situated to minimize casual exposure of personnel.
- Building exit pathways are located to provide rapid egress in emergency evacuations.
- Emergency lighting devices are located strategically throughout the 200 Area ETF.
- Audio and/or visual alarms are provided for all room air samplers, area alarms, and liquid monitors. Visual readouts for these alarm systems are located in less contaminated areas to minimize exposure to personnel.
- Areas for decontaminating and maintaining equipment are provided in contaminated areas to limit the spread of contamination to uncontaminated areas such as the 200 Area ETF Control Room.
- Instrument interlock systems automatically return process operations to a safe condition if an unsafe condition should occur.
- The 200 Area ETF ventilation systems are designed to provide airflow from uncontaminated zones to progressively more contaminated zones.

Whenever possible, exposures to hazards are controlled by accepted engineering and/or administrative controls. Protective gear is used where effective engineering or administrative controls are not feasible.

F.3 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste

Typically, aqueous waste managed at the LERF or 200 Area ETF does not display the characteristics of reactivity or ignitability. Any aqueous waste streams exhibiting these characteristics are blended or mixed at LERF to a concentration where the waste no longer exhibits reactive or ignitable characteristics.

Incompatible aqueous waste is not expected to be stored or treated at the LERF or 200 Area ETF (Addendum B, Waste Analysis Plan). Therefore, the requirements of WAC 173-303-806(4)(a) are not applicable.

ADDENDUM H
CLOSURE PLAN

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ADDENDUM H
CLOSURE PLAN

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H. CLOSURE PLAN

This addendum describes the planned activities and performance standards for closing Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF).

H.1 Closure Plan

The LERF and 200 Area ETF will be closed by removal or decontamination with respect to dangerous waste contamination that resulted from operation as Treatment, Storage, and Disposal (TSD) units, with closure of LERF occurring first. To facilitate closure, the LERF retention basins are being viewed as consisting of seven components: the covers and primary liner, drainage layer system/bentonite carpet liner, secondary liner, soil/bentonite, internal and/or external piping, ancillary equipment, and concrete basins. To facilitate closure of 200 Area ETF, the 200 Area ETF is being viewed as consisting of six components: tanks, internal and/or external piping, ancillary equipment, concrete floors/dikes/ encasements, structures, and soil directly beneath the structure. It is anticipated that closure of LERF and 200 Area ETF will begin after the projected 30-year active life of LERF and 200 Area ETF. If it is determined that closure by removal or decontamination is not possible, the closure plan will be modified to address required post closure activities.

Uncontaminated structures will be left for future use or disassembled, dismantled, and removed for disposal. Uncontaminated equipment and structures could include aqueous makeup, HVAC and piping, steam condensate and cooling water piping, and the 200 Area ETF Control Room and office areas.

Closure by removal or decontamination requires decontamination or removal and disposal of all dangerous waste, waste residues, contaminated equipment, soil, or other material established in accordance with the removal or decontamination closure performance standards of WAC 173-303-610(2). This and future closure plan revisions will provide for compliance with these performance standards.

H.2 Closure Performance Standard

Closure by removal or decontamination, as provided for in this plan based on the requirements of WAC 173-303-610(2), will eliminate future maintenance and will be protective of human health and the environment by removing or reducing chemical contamination at LERF and 200 Area ETF to levels that are below concern with respect to human health and the environment.

This plan proposes to leave clean structures and equipment in place after closure for potential use in future operations. This need will be evaluated at the time of closure.

H.2.1 Closure Standards for Metal Surfaces, Rubber, Tanks, and Concrete

This closure plan proposes use of a 'clean debris surface' (defined in the following paragraph) as the clean closure performance standard for the metal surfaces, rubber (i.e., basin covers, liners, etc.), tanks, and concrete that will remain after closure. This approach is consistent with the Washington State Department of Ecology (Ecology) guidance (Publication #94-111, Ecology 2005) for achievement of clean closure. Additionally, adherence to this guidance ensures that all residues have been removed as required by WAC 173-303-640 for closure of the 200 Area ETF tank systems.

The clean debris surface standard is verified visually.

> *A clean debris surface means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area* (40 CFR 268.45).

When a physical extraction method is used on concrete, the performance standard is based on removal of the contaminated layer of debris. The physical extraction performance standard for concrete is removal of 0.6 centimeter (0.25 inches) of the surface layer and treatment to a clean debris surface. Inspections to verify achievement of a clean debris surface will be performed and documented.

H.2.2 Closure Standards for Piping and Ancillary Equipment

The internal and external piping of both LERF and 200 Area ETF that has contacted dangerous waste will be flushed and drained as part of closure. When practical, ancillary equipment, which has contacted dangerous waste will also be flushed and drained. For piping and ancillary equipment where the contaminated surfaces can be inspected, an inspection will be performed to see if the surfaces meets the clean debris surface standard in 40 CFR 268.45, incorporated by reference by WAC 173-303-140, and can be declared non-dangerous in accordance with WAC 173-303-071(3)(qq). If it is not possible to inspect the contaminated surfaces or meet the clean debris surface performance standard, the particular piping or ancillary equipment of concern will be removed, designated, and disposed of accordingly.

Dangerous and/or mixed-waste materials generated during closure activities will be managed in accordance with WAC 173-303-610(5). Removal of any dangerous wastes or dangerous constituents during partial or final closure will be handled in accordance with applicable requirements of WAC 173-303-610(5).

H.2.3 Closure Standards for Underlying Soils

The LERF retention basins have a leachate collection system that channels the leachate to sumps at the bottom of the basins. The collected liquid is pumped back into the basins, thereby limiting fluid head on the secondary liner. The secondary liner is comprised of several protective layers, including a high-density polyethylene geomembrane and a soil/bentonite admixture. The soil below the LERF only could be contaminated if the layers of the secondary liner had failed. The primary liner and the drainage gravel, geotextile, and geonet between the primary and secondary liners cannot easily be decontaminated. The high-density polyethylene layer of the secondary liner also cannot be decontaminated. These materials will be removed and disposed according to the requirements of WAC 173-303-170. The soil/bentonite admixture will be sampled and analyzed for constituents of concerns according to the sampling and analysis plan developed prior to the time of closure. If the analytical results determine that the constituents of concern are at or below the levels in WAC 173-303-610(2)(b)(i), or background levels for Hanford soil if background is greater, the soil/bentonite admixture and the soil below LERF will be considered clean closed.

Clean closure of soil under the 200 Area ETF will be accomplished by demonstrating that the coated concrete floor kept contaminants from reaching the soil. The coated concrete floor provided secondary containment for all the tanks and process piping. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks and there have been documented spills in the vicinity, potential soil contamination will be investigated. Soils will be sampled and analyzed for constituents of concern according to the sampling and analysis plan. The sampling and analysis plan will be prepared following the completion of a data quality objectives process in accordance with EPA/600/R-96/055 (QA/G-4), *Data Quality Objectives Process*, as amended. The data quality objectives process will be initiated prior to closure on a schedule to ensure timely closure of LERF. The sampling and analysis plan will be submitted to Ecology as part of a permit modification request meeting the requirements of WAC 173-303-830. The sampling and analysis plan will be prepared consistent with EPA/240/B-01/003 (EPA QA/R-5), *EPA Requirements for Quality Assurance Project Plans*, as amended.

If the soil analytical results determine that the constituents of concern are at or below the levels in WAC 173-303-610(2)(b)(i), or background levels in the Hanford soil if background is greater, the soil will be considered clean closed. If the constituents of concern exceed background levels, the soil will be closed per the standards of WAC 173-303-610(2)(b).

H.3 Closure Activities

The LERF and 200 Area ETF were designed for a 30-year active life.

At the time of closure, the closure plan will be modified as necessary to reflect current regulation or informational revisions in accordance with WAC 173-303-610(3)(b). If it is determined that clean closure is not possible, the closure plan will be modified to address required post closure activities.

H.3.1 General Closure Activities

The approach to LERF closure is to dispose of accumulated basin aqueous waste by processing the waste through 200 Area ETF. Primary basin liners, covers, drainage gravel, geonets, and secondary High Density Polyethylene (HDPE) liners will be removed, designated, and disposed of as described in Sections H.3.4.1 and H.3.4.2. Any remaining solids (residue) within the basins will also be removed, designated, and disposed of accordingly. Piping associated with LERF closure is intended to be decontaminated, drained, and inspected. Piping that meets the closure standard in Section H.2.2 will be left in place. Piping that does not meet the closure standard, or cannot be inspected, will be disposed of accordingly. Rinsate generated during decontamination also will be disposed of through 200 Area ETF. Sampling will assess whether contamination beneath the secondary HDPE liner has occurred. Contamination above background levels, if present, will be removed or decontaminated to meet the regulatory requirements of WAC 173-303-610(2)(b).

The approach to 200 Area ETF closure is to process any aqueous waste through the effluent treatment system. Any waste, which cannot be treated at 200 Area ETF as the facility is being closed, will be transferred to other TSD units or off-site TSD facility. Piping will be rerouted and temporary piping installed to allow the isolation of tanks and ancillary equipment for draining, decontamination, and closure. Rerouted and temporary piping will be closed in the same manner as process piping. All structures and equipment will be decontaminated to the closure standards in Section H.2.2 or disposed. Piping associated with 200 Area ETF closure is intended to be decontaminated, drained, and inspected. Piping that meets the closure standard in Section H.2.2 will be left in place. Piping that does not meet the closure standard, or cannot be inspected, will be disposed of accordingly. Contamination, if present, will be managed in compliance with regulatory requirements.

Equipment or materials used in performing closure activities will be decontaminated or disposed at a permitted facility.

H.3.2 Constituents of Concern for Closure for the Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility

Using the list of dangerous waste numbers in the Addendum A, Part A Form, constituents in the final delisting in 40 CFR 261 Appendix IX, sample results from wastes added to LERF and 200 Area ETF, process knowledge and the risk to human health and the environment, the constituents of concern for closure will be determined through the data quality objective process. Based on constituents in wastewater received at LERF from 2000 to 2006 which are present at five percent of their delisting levels or higher, the constituents of concern are:

- Acetone
- Ammonia
- Barium
- Chromium
- Carbon tetrachloride
- Fluoride
- Lead
- Mercury
- Methyl ethyl ketone
- n-Butyl alcohol
- Total cresols
- Tributyl phosphate
- Vanadium

Arsenic and beryllium are excluded because they are present in Hanford soils and may therefore give a false positive sample result. Constituents of concern vary in each basin. For example, ammonia may be present only in LERF Basin 42. The constituents of concern for each basin will be determined by process knowledge as part of the Data Quality Objectives process for the Sampling and Analysis Plan.

H.3.3 Removing Dangerous Waste

At the start of LERF closure, aqueous waste will be transferred sequentially from each basin to another LERF basin or to 200 Area ETF for treatment.

At a pump rate of about 284 liters (75 gallons) per minute, it will take approximately 60 days to empty a full basin. Basin covers will remain in place to prevent possible wind dispersion of waste until all basin waste has been removed.

All of the aqueous waste inventory at the 200 Area ETF will be processed before closure. Any residue remaining in piping, equipment, or the LERF liner will be removed to an appropriate disposal unit. All containerized waste will be dispositioned. All secondary waste in containers will be transferred to an appropriate TSD unit.

H.3.4 Decontaminating Structures, Equipment, and Soils

This section discusses the activities necessary to implement a clean closure strategy for the LERF and 200 Area ETF.

H.3.4.1 Covers and Primary Liner

The following steps will be performed to close each LERF basin cover and primary liner:

- Wastewater will be removed from the basins and transferred to another LERF basin or to 200 Area ETF. Additional pumps and piping may be installed to empty the basin as low as possible.
- The basin cover will be cut into pieces and disposed in containers.
- As much as practical of the remaining residue within the basins will be removed and transferred to containers, another LERF basin, or 200 Area ETF. Rinsing may be performed to facilitate removal.
- The pipe risers, transfer pump, HDPE primary liner and bentonite carpet liner will be cut into pieces and disposed in containers.

H.3.4.2 Drainage Layer and Secondary Liner

The following steps will be performed to close each LERF basin drainage layer and secondary liner:

- The drainage gravel, geotextile, and geonet will be cut into pieces, and disposed in containers.
- As much as practical of the remaining residue on the secondary liner will be removed and transferred to containers, another LERF basin or 200 Area ETF. Rinsing may be performed to facilitate removal of residue.
- The HDPE liner portion of the secondary liner will be visually inspected for physical damage. This will provide potential sampling locations to determine if the soil/bentonite below the HDPE liner may be clean closed.
- The leachate pump, pump riser, and HDPE liner portion of the secondary liner will be removed, cut into pieces, and disposed in containers.
- The soil/bentonite portion of the secondary liner will be visually inspected for signs of contamination. This will provide potential sampling locations to determine if the soil/bentonite may be clean closed.

Assessment of contamination beneath the LERF's secondary liner will be performed within each basin by sampling the top surface of the 91-centimeter (36-inch) thick layer of soil/bentonite. Biased and random location selection will be used to increase the probability of detecting leachate contamination. Some sampling points will be chosen randomly, while others will be chosen where physical damage was noted during the inspection of the secondary HDPE liner and soil/bentonite layer, and in areas where the underlying material porosity and permeability and the hydraulic head would most likely drive any leachate. The leakage rate through the liner would increase toward the bottom of the liner as hydraulic head increases. Any leakage that did occur in the sloped sides could be expected to travel down slope through the geotextile between the primary and secondary liner until reaching the bottom of the liner.

Therefore, the most likely area of contamination would be the soil/bentonite in the leachate sump and at the bottom of the basin. Sampling and disposal objectives will be determined at the time prior to closure activities through the data quality objectives process. The sampling and analysis plan will be prepared following the completion of a data quality objectives process in accordance with EPA/600/R-96/055 (QA/G-4) *Data Quality Objectives Process*, as amended.

The data quality objectives process will be initiated prior to closure on a schedule to ensure timely closure of LERF. The sampling and analysis plan will be submitted to Ecology as part of a permit modification request meeting the requirements of WAC 173-303-830. The sampling and analysis plan will be prepared consistent with EPA/240/B-01/003 (EPA QA/R-5), *EPA Requirements for Quality Assurance Project Plans*, as amended.

Sampling of the soil/bentonite will be performed in accordance with the sampling methods allowed for in WAC 173-303-110(2). Special care will be needed in sampling for volatiles. To aid in ensuring sample integrity, the initial sampling of the soil/bentonite may proceed while the secondary HDPE liner is in the process of being removed.

If no constituents of concern are found above soil closure performance standards (Section H.2.3), no further analysis will be done. If the initial sample analysis indicates liner leakage, additional samples from different depths and locations will be taken to determine the spatial extent of contamination. The soil/bentonite will be removed in the area around the contamination and placed in containers. If contamination is found to extend through the entire depth of the soil/bentonite layer, soil beneath the basin that is contaminated above closure performance standards will also be removed and placed in containers.

H.3.4.3 Tanks

The following general steps will be performed to close, each 200 Area ETF tank and ancillary equipment:

- Wastewater and chemical additions to the tank will be isolated or rerouted to a downstream tank.
- Piping and ancillary equipment associated with the tank will be flushed with water and drained to the tank being closed, to another tank, or to containers.
- Wastewater will be removed from the tank and transferred to another tank. Additional pumps and piping may be installed to empty the tank as low as possible.
- All remaining residue at the bottom of the tank will be removed and transferred to another tank or containers. Rinsing may be performed to facilitate removal of residue.
- An initial visual inspection of the tank's interior and exterior surfaces will be performed to determine the type of flushing that will allow the tank to be clean closed, or whether the tank cannot be clean closed.
- The tank's surfaces, piping and ancillary equipment will be cleaned by chemical or physical extraction techniques described in 40 CFR 268.45. Flush solution will be transferred to another tank or containers. All flush solution at the bottom of the tank will be removed before visual inspection.
- The tank, piping, and ancillary equipment will be inspected visually for compliance with the performance standard in Sections H.2.1 and H.2.2.

Closure will begin with the Load-In Station tanks, surge tank, and other tanks of the main treatment train. The secondary treatment train will operate as long as possible to reduce the volume of flush water requiring disposal. Condensate from the secondary treatment train will be routed to the main treatment train or the verification tanks for storage or treatment.

After rinsing, the tanks will be inspected visually for compliance with the performance standard. Visual inspection might be made remotely using a camera or other device that allows verification of meeting the performance standard.

If any areas are found not meeting the clean debris surface performance standard, these areas will be decontaminated in-place, or the contaminated portions will be removed, designated, and disposed accordingly. Per 40 CFR 268.45, Table 1 incorporated by reference at WAC 173-303-140, only removal of contaminants from the surface layer is necessary for metal surfaces.

The outside of the tanks also will be inspected for compliance to the performance standard. Any areas found not to meet this performance standard will be decontaminated in-place, or the contaminated portions will be removed, designated, and disposed accordingly.

Before using decontamination solutions on the outside of the tanks, the floor will be inspected for cracks or other openings that could provide a pathway to soil. This inspection will be performed as described in Section H.2.3 in conjunction with mapping of potential through-thickness cracks. Any such cracks will be mapped. The cracks will be sealed before beginning treatment or other engineered containment devices (e.g., portable catch basins, liners) will be used to collect and contain solutions.

Decontamination residues will be collected, designated, and managed as appropriate. If it is not possible to meet the clean closure performance standard, contaminated portions of the tanks could be removed, designated, and disposed of accordingly. The inspections for a clean debris surface will be documented on an inspection record.

H.3.4.4 Internal and External Piping and Ancillary Equipment

The internal piping and ancillary equipment for both LERF and 200 Area ETF, which have contacted dangerous waste will be flushed and drained as part of closure. Any treatment media, such as filters, reverse osmosis membranes, ion exchange resins, will be removed from the ancillary equipment, and disposed of accordingly. Where the contaminated surfaces can be inspected, an inspection will be performed to see if the piping and ancillary equipment meet the clean debris surface standard in 40 CFR 268.45 and can be declared non-dangerous. If it is not possible to meet the clean debris surface standard or the piping or ancillary equipment cannot be inspected, those portions of the piping and ancillary equipment will be removed, designated, and disposed of accordingly.

External piping (transfer lines) associated with LERF and 200 Area ETF consist of below grade and above grade piping. Below grade, piping will be dispositioned at closure consistent with the practices for below grade piping in the 200 Areas at the time of closure consistent with the 200-IS-1 operable unit decisions. Above grade piping will be dispositioned consistent with the provisions for internal piping.

Rinsate from the LERF and 200 Area ETF external piping and LERF internal piping will be processed through 200 Area ETF. Dangerous and/or mixed-waste solutions and materials generated during closure activities, which cannot be treated at 200 Area ETF will be managed in accordance with WAC 173-303-610(5).

H.3.4.5 Concrete

At LERF, the concrete catch basins are located at the northeast corner of each retention basin, where inlet pipes, leachate risers, and transfer pipe risers emerge for the basin. The concrete catch basin is curbed, and coated with a chemical resistant epoxy sealant. The concrete catch basin is sloped so that any leaks or spills from the piping or connections will drain into the basin. At the 200 Area ETF, the coated concrete floor and berm provides secondary containment for all the tanks and process piping.

Closure of concrete at LERF and 200 Area ETF will be performed after the associated tanks, piping, ancillary equipment, and structures have been closed. All concrete will be inspected visually and surveyed before any decontamination. The purpose of the inspection will be twofold: to identify and map any cracks in the concrete that might have allowed contaminants a pathway to the soil below (Section H.2.3), and to identify areas that potentially are contaminated with dangerous waste or dangerous waste residues. The inspection standard will be a clean debris surface as defined in Section H.2.1. The inspection of the concrete for a clean debris surface will be documented on an inspection record. Those areas already meeting the standard can be clean closed as is.

Those potentially contaminated areas will undergo decontamination to meet the clean closure standard of a clean debris surface. The concrete will be washed down; the rinsate collected, designated, and disposed of accordingly. The concrete will be reinspected for a clean debris surface. Concrete surfaces indicated by visual examination, as still being potentially contaminated will have the surface layer removed to a depth of 0.6 centimeter (0.25 inches) by scabbing or other approved methods. This will not threaten the environment, even if potential through-thickness cracks had been found during the inspection, because concrete decontamination (scabbing) will not employ liquid solutions that could enter cracks and because scabbing residues will be vacuumed away from cracks as, any residue is generated.

Achievement of a clean debris surface will be documented on an inspection record. Decontamination residues will be collected, designated, and managed as appropriate.

H.3.4.6 Structures

If contaminated with either dangerous or mixed waste constituents, the 200 Area ETF structures will be decontaminated and/or disassembled, if necessary, packaged, and disposed of in accordance with existing land disposal restrictions (WAC 173-303-140).

Closure steps could include the following activities.

- Containerize (as necessary and practicable) and remove any remaining waste.
- Review operating records for spillage incidents and visually inspect storage area surfaces for evidence of contamination or for cracks that could harbor contamination or allow the escape of decontamination solutions. Inspect storage area surfaces for visible evidence of contamination (e.g., discoloration, material degradation, wetness, and odor). If contamination is evident, the affected area(s) will be decontaminated.
- Decontaminate 200 Area ETF walls and floors to minimize the potential for loose contamination and facilitate any required surveys and/or chemical field screening. The structures could be cleaned by water rinse or high-pressure, low-volume steam cleaning coupled with a detergent wash. After decontamination, the walls and floors will be compared to closure performance standards.
- Collect rinsate and manage as dangerous waste for appropriate disposal.
- Secure (lock) personnel entries into building and post doors with appropriate warning signs.

H.3.4.7 Underlying Soils

Clean closure of soil under LERF's secondary liner will be accomplished by demonstrating that the liners and leak detection system kept contaminants from reaching the soil. The secondary liner provided secondary containment for the LERF basins. Unless inspections identify potential leaks, punctures, cracks, or tears indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such leaks, punctures, etc., potential soil contamination will be investigated.

Clean closure of soil under 200 Area ETF will be accomplished by demonstrating that the coated concrete floor kept contaminants from reaching the soil. The coated concrete floor and bermed area provided secondary containment for all the tanks and process piping. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks and there have been documented spills in the vicinity, potential soil contamination will be investigated.

Where it is possible visually to inspect directly beneath the tanks, a visual inspection will be performed. Where it is not possible visually to inspect beneath the tanks, an evaluation of the tank integrity will be made. The condition of the tank will be evaluated to determine if there was any potential for leakage. If no cracks, severe corrosion, or evidence of leaks is observed, it will be reasoned that mixed or dangerous waste solutions could not have penetrated to the soil directly below the tank.

External piping (transfer lines) between the 242-A Evaporator and LERF and 200 Area ETF are double lined with a leak detection system. If records indicate that no leaks from the primary piping occurred, the soil will be considered clean with respect to RCRA closure.

Where there is evidence that contamination may have leaked into the soil below tanks, concrete, or the soil/bentonite layer at LERF, the contaminated tank, concrete, or soil/bentonite layer will be removed to allow the underlying soil to be sampled to determine the depth of the contamination. Soil that is contaminated above the closure performance standards in Section H.2.3 will be removed, placed in containers, and disposed accordingly.

H.4 Maximum Waste Inventory

The maximum waste inventory for LERF and 200 Area ETF is in Addendum A.

H.5 Closure of Containers, Tanks, and Surface Impoundments

The following sections cover closure of containers, closure of tanks, and closure of surface impoundments.

H.5.1 Closure of Containers

Containers at 200 Area ETF will be used to contain dangerous waste in the event of a spill, unexpected release, or equipment failure. Containers will be used to accumulate nonradioactive dangerous waste and/or mixed wastes. All containers will be emptied and treated prior to closure of 200 Area ETF. Any containers used to contain dangerous and/or mixed waste at the 200 Area ETF that is generated during the closure process and therefore cannot be treated at 200 Area ETF will be designated and shipped to an onsite TSD unit or off-site TSD facility. Containers of dangerous and/or mixed waste will not be left in the 200 Area ETF after closure.

H.5.2 Closure of Tanks

Clean closure of 200 Area ETF will consist of the removal and disposal of all dangerous waste and the decontamination and/or removal and disposal of equipment which does not meet the performance standards in Section H.2, including tanks. The 200 Area ETF was designed to incorporate removable components. This design facilitates closure by allowing complete removal of equipment, which does not meet the performance standards.

H.5.3 Closure of Surface Impoundments

At closure, all of LERF that received regulated waste will be closed in accordance with the requirements of this approved closure plan, which are intended to ensure compliance with the requirements of WAC 173-303-650(6)(a)(i). All equipment, structures, and other material associated with closure of LERF will be decontaminated or removed in accordance with WAC 173-303-610(2). All basin waste and decontamination rinsate will be transferred to 200 Area ETF. Sampling and testing will be conducted as described in Section H.3.4.2.

H.6 Schedule for Closure

Closure of LERF and 200 Area ETF is not anticipated to occur within the next 30 years. The actual year of closure will depend on the time required for current waste to be processed and what role the LERF and 200 Area ETF will play in processing additional waste generated during future activities in the 200 Areas. Other factors affecting the year of closure include changes in operational requirements, lifetime extension upgrades, and unforeseen factors. When a definite closure date is established, notification of closure will be provided in accordance with Permit Condition II.J.3.

The activities required to complete closure are planned to be accomplished within 180 days in accordance with WAC 173-303-610(4)(b). Should a modified schedule be necessary, a revised schedule will be proposed through the permit modification procedure in accordance with WAC 173-303-610(4)(b).

ADDENDUM I
INSPECTION REQUIREMENTS

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ADDENDUM I
INSPECTION REQUIREMENTS

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I. INSPECTION REQUIREMENTS

I.1 Inspection Plan

This addendum describes the method and schedule for inspections of the Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF). The purpose of inspections is to help ensure that situations do not exist that might cause or lead to the release of dangerous and/or mixed waste that could pose a threat to human health and the environment. Abnormal conditions identified by an inspection will be corrected on a schedule that prevents hazards to workers, the public, and the environment.

I.1.1 General Inspection Requirements

The content and frequency of inspections are described in this section. Inspection records are retained in the Hanford Facility Operating Record, LERF and 200 Area ETF file, or other approved locations, in accordance with Permit Condition II.I.1.

In certain areas of the 200 Area ETF, many inspections are performed remotely to maintain as low as reasonably achievable (ALARA) exposure. Monitoring instruments are connected to audible alarms and visual indicators track alarm status. The monitoring system provides trending of selected monitoring data, graphics, and equipment summary displays.

A preventive maintenance recall system is employed to direct preventive maintenance activities at the LERF and 200 Area ETF. Equipment requiring maintenance is checked as indicated by the maintenance history and the manufacturer's recommendations. The preventive maintenance of certain equipment might not be possible if the LERF or the 200 Area ETF is in an operational mode. Thus, the preventive maintenance could be performed slightly earlier or later than planned to minimize impact on operations.

Instrumentation at 200 Area ETF is calibrated regularly to ensure accuracy and reliability. All process control instrumentation is calibrated on a schedule depending on previous calibration experience. An instrument calibration and recall system is employed to manage calibrations.

I.1.1.1 Types of Problems

Key components of the LERF inspection program include the following areas:

- Structural integrity of the basins.
- Catch basin secondary containment system integrity.
- Evidence of release from basins.
- Safety, communications, and emergency equipment.

Key components of the 200 Area ETF inspection program include the following areas:

- Condition of tanks and ancillary piping.
- Condition of containers.
- Condition of the process control equipment.
- Condition of emergency equipment.
- Condition of secondary containment.

Table I.1 and Table I.2 provide a description of LERF and 200 Area ETF items to be inspected.

I.1.1.2 Frequency of Inspections

The frequency of inspections is based on the rate of possible deterioration of equipment and the probability of a threat to human health or the environment.

The LERF and 200 Area ETF is inspected as indicated in Table I.1 and Table I.2.

I.1.2 Specific Process Inspection Requirements

The following sections describe the specific process inspections performed at LERF and 200 Area ETF.

I.1.2.1 Container Inspections

Containers are used at the 200 Area ETF to store solidified secondary waste, such as the powder waste from the thin film dryer and maintenance and operations waste. When containers are being held in container storage areas, the following inspection schedule is maintained:

- Daily visual inspection of container storage area for leaks, spills, accumulated liquids, and open or improperly sealed containers.
- Weekly visual inspection of container labels to ensure labels are not obscured, removed, or otherwise unreadable.
- Weekly visual inspection for deterioration of containers, containment systems, or cracks in protective coating or foundations caused by corrosion, mishandling, or other factors.

Following the inspections, an inspection datasheet is signed and dated by the inspector and supervisor.

I.1.2.2 Tank Inspections

A description of the tank systems and ancillary equipment at the 200 Area ETF is given in Addendum C. Inspections and frequencies are given in Table I.1 and Table I.2. This section includes a brief discussion of the inspections.

I.1.2.2.1 Overfill Protection

Tanks that have the possibility of being overfilled have level instrumentation that alarms before the tanks reach overflow. High tank level alarms annunciate in the 200 Area ETF Control Room, allowing operating personnel to take immediate action to stop the vessels from overfilling. These alarms are monitored continuously in the 200 Area ETF Control Room during solution transfers. When tank level instrumentation is inoperable, the alternate controls discussed in Addendum C, Section C.4.4.2 are followed to prevent tank overfilling.

I.1.2.2.2 Visual Inspections

Visual inspections of tanks and secondary containments are performed to check for leaks, signs of corrosion or damage, and malfunctioning equipment. Inspections are performed on tanks, secondary containment within the 200 Area ETF, surge tank, and verification tank, and associated secondary containment.

I.1.2.2.3 Secondary Containment Leak Detectors

The surge tank and verification tank secondary containment systems have sloped floors that drain solutions to sumps equipped with leak detectors that alarm in the 200 Area ETF Control Room. These alarms are monitored continuously in the 200 Area ETF Control Room during 200 Area ETF processing operations or during waste transfer, and at least daily when processing operations or waste transfers are not occurring. If an alarm is activated, further investigation is performed to determine if the source is a tank leak or other solution (i.e., precipitation).

I.1.2.2.4 Integrity Assessments

The initial integrity assessment was issued in 1995 (Addendum C). Consistent with the recommendations of the integrity assessment, a periodic integrity assessment program was developed for the 200 Area ETF tanks and is discussed in detail in Addendum C, Section C.4.1.5.

I.1.2.2.5 Effluent Treatment Facility Piping

The 200 Area ETF employs an extensive piping system. During inspections at the 200 Area ETF, any aboveground piping is inspected visually for signs of leakage and for general structural integrity.

During the visual inspection, particular attention is paid to valves and fittings for signs of cracking, deformation, and leakage.

I.1.2.3 Surface Impoundments and Condition Assessment

The following describes the surface impoundment inspections performed at LERF.

I.1.2.3.1 Overtopping Control

Under current operating conditions, 0.61 meters (2 feet) of freeboard is maintained at each LERF basin, which corresponds to an operating level of 6.8 meters (22.2 feet), or operating capacity of 29.5 million liters (7.8 million gallons). Level indicators at each basin are monitored to confirm that this level is not exceeded.

Before an aqueous waste is transferred into a basin, administrative controls are implemented to ensure overtopping will not occur during the transfer. The volume of feed to be transferred is compared to the available volume in the receiving basin. The transfer is not initiated unless there is sufficient volume available in the receiving basin or a cut-off level is established. The transfer into the basin would be stopped when this cut-off level is reached.

The LERF basins also are provided with floating very low-density polyethylene covers that are designed and constructed to prevent overtopping by the introduction of precipitation and dust into the basins. Overtopping and flow control also are discussed in Addendum C.

I.1.2.3.2 Impoundment Contents

The LERF basins are inspected weekly to assess whether the contents are escaping from a basin. Level indicators are inspected weekly to check for unaccountable change in the level of the basins.

I.1.2.3.3 Leak Detection

The leachate detection, collection, and removal system is described in Addendum C. The leachate collection sump pump is activated when the liquid level in the leachate sump reaches a preset level. A flow meter/totalizer measures the amount of leachate removed. In addition, the timer on the leachate pump tracks the cumulative pump run time. The leak rate through the primary liner can be determined using one of two methods:

1) Measured as the leachate flow meter/totalizer readings (flow meters/totalizers are located on the outflow line from the collection sumps in the bottom of the LERF basins) or
2) Calculated using the pump operating time readings multiplied by the pump flow rate (the pump runs at a constant flow rate).

Calculations using either method are sufficient for compliance. If either the flow meter/ totalizer or pump operating time system is not functioning, this is identified as an abnormal condition (see Section I.1).

The LERF employs a double walled transfer piping between 242-A Evaporator and LERF and between LERF and 200 Area ETF. The WAC 173-303-650 regulations do not require a discussion of piping for surface impoundments. However, for the purposes of comprehensive coverage of the LERF, inspections and integrity assessments are performed on the piping system. Aqueous waste (e.g., process condensate) is transferred from the 242-A Evaporator to the LERF via a buried pipeline. Likewise, aqueous waste is transferred to the 200 Area ETF via buried pipelines. At the LERF dikes, aboveground piping serves to transfer waste from one basin to another.

The buried pipelines normally are continuously monitored during transfers by a leak detection system (Addendum C). Leak detection system alarms annunciate to the 200 Area ETF Control Room, which is monitored continuously during waste transfers and daily when no waste is transferring. As an alternative to continuous leak detection, the transfer lines can be inspected daily during transfers by opening the secondary containment drain lines at the LERF catch basins (for 242-A Evaporator transfers to LERF) and the surge tank (for LERF transfers to 200 Area ETF) to inspect for leakage.

During the routine inspections at LERF, the aboveground piping system is inspected for signs of leakage and for general structural integrity. During the visual inspection, particular attention is paid to valves and fittings for signs of cracking, deformation, and leakage.

I.1.2.3.4 Dike Erosion

The LERF basins and dikes are visually inspected weekly and after significant precipitation events for run-on, run-off, cover integrity, erosion problems, or other signs of deterioration in the dikes from precipitation, wind, burrowing mammals, or vegetation.

I.1.2.3.5 Structural Integrity

A written certification attesting to the structural integrity of the basin dikes, signed by a qualified, registered professional engineer, is provided in Addendum C.

I.1.2.3.6 Container Inspection

Normal operation of the LERF does not involve the storage of dangerous waste in containers. Therefore, the inspection requirements of this section normally are not applicable to the LERF. Any containerized dangerous waste generated at LERF will be brought to the 200 Area ETF and managed in accordance with WAC 173-303-630 and is discussed in Addendum C.

I.1.3 Inspection Log

Observations made and deficiencies noted during an inspection are recorded on inspection log sheets (also called turnover sheets). On completion, the log sheet includes the inspector's printed name, signature, date, and time; the log sheet is submitted for review and approval by LERF and 200 Area ETF management or their designee, as required by operating procedures. Once approved, the log sheet is kept in the Hanford Facility Operating Record, LERF and 200 Area ETF files. Inspection records are retained in the Hanford Facility Operating Record, LERF and 200 Area ETF files, or other approved locations, in accordance with Permit Condition II.I.1. The inspection records are used to help determine any necessary corrective actions. Problems identified during the inspections are prioritized and addressed in a timely fashion to mitigate health risks to workers, maintain integrity of the TSD units, and prevent hazards to public health and the environment.

If while performing an inspection, a leak or spill is discovered, facility operations responds per the emergency response procedures action is taken to stop the leak and determine the cause. The waste is removed from the secondary containment in a timely manner that prevents harm to human health and the environment.

I.1.4 Storage of Ignitable or Reactive Wastes

The LERF could receive an aqueous waste that is designated reactive or ignitable. Any aqueous waste exhibiting these characteristics is managed (e.g., through blending in LERF) such that the waste no longer exhibits the reactive or ignitable characteristics.

Though unlikely, the 200 Area ETF secondary wastes might have the characteristics of being reactive or ignitable. A qualified inspector performs annual fire inspections of the 200 Area ETF using a checklist developed specifically for facilities that handle dangerous and/or mixed waste.

1 **Table I.1. Visual Inspection Schedule for the LERF and 200 Area ETF**

Item	Inspection	Frequency
2025-ED Load-In Station		
Load-In Station tank system	Inspect area for leaks. Note any unusual noises or vibration from the system pumps. Inspect secondary containment system for signs of deterioration.	Daily
Main Treatment Train		
Surge tank system	Inspect area for leaks. Note any unusual noises or vibration from the system pumps. Inspect secondary containment system for signs of deterioration.	Daily
Rough filter	Inspect for leaks.	Daily
Ultraviolet oxidation system	Inspect module for leaks Inspect peroxide storage tank, ancillary equipment for leaks.	Daily
pH adjustment tank	Inspect tank and ancillary equipment for leaks	Daily
H_2O_2 decomposer	Inspect tank and ancillary equipment for leaks	Daily
Fine filter	Inspect module for leaks	Daily
Degasification system	Inspect module for leaks. Note any unusual noises or vibration from the degasification blower.	Daily
Reverse osmosis system	Inspect tanks and ancillary equipment for leaks. Note any unusual noises or vibration from the system pumps.	Daily
Polishers	Inspect tanks and ancillary equipment for leaks.	Daily
Effluent pH adjustment tank	Inspect tank and ancillary equipment for leaks.	Daily
Verification tanks	Inspect tanks and ancillary equipment for leaks. Note any unusual noises or vibration from the system pumps. Inspect secondary containment system for signs of deterioration.	Daily
Secondary Treatment Train		
Secondary waste receiving tank	Inspect tank and ancillary equipment for leaks	Daily
200 Area ETF evaporator	Inspect tank and equipment for leaks. Note any unusual noises or vibration from the system pumps or compressor.	Daily
Concentrate tank	Inspect tank and ancillary equipment for leaks.	Daily
Thin Film Dryer Room	Inspect piping and ancillary equipment for spills, leaks, and accumulated liquids (viewed through camera). Note any unusual noises or vibration from the system pumps or blower.	Daily[1]
Container handling	Inspect area for spills, leaks, accumulated liquids.	Daily
Container handling	Inspect for deterioration of containers and secondary containment, including corrosion and cracks in secondary containment foundation and coating. Inspect container labels to ensure that they are readable.	Weekly
Support Systems		
Vessel ventilation system	Inspect filters (HEPA and pre-filters), check vessel off gas pressures, system flow, and discharge temperatures.	Daily
Sump tank system	Inspect sump trenches for unexpected liquids, which indicate spills or leaks from process equipment.	Daily

[1]If the camera system is inoperable, daily visual inspections will be performed or the Thin Film Dryer will be emptied and isolated as described in Addendum C, Section C.4.4.2, to prevent waste additions that could result in undetected leaks or spills in the Thin Film Dryer Room.

Safety Systems		
Eye wash stations	Check status; check for adequate pressure	Monthly
Safety showers	Check status; check for adequate pressure	Monthly
Emergency Systems		
Fire extinguishers	Check for adequate charge.	Monthly
Emergency lighting	Test operability.	Monthly
Processing Area		
Uninterruptible power supply	Check output voltage and visually inspect battery pack for corrosion and leakage. Check indicator lights for fault conditions.	Annually
LERF (Surface Impoundment)		
LERF basins and dikes	Check the overtopping controls and integrity of the basins and dikes	Weekly
LERF contents	Check basin level indicators for unaccountable changes in the level of the basins	Weekly
Leak Detections	Determine the leak rate per wetted surface area	Weekly
LERF basins and dikes	Check for run-on, run-off, cover integrity, erosion problems, and other signs of deterioration	Weekly & After significant precipitation events
Ignitable and Reactive		
Ignitable and reactive waste	Storage in compliance with Hanford Site fire protection standards and WAC 173-303-630(8)	Annually[2]
Container Storage Areas Other Than Secondary Treatment Train		
Container Storage	Container labels to ensure labels are not obscured, removed, or otherwise unreadable	Weekly
	Deterioration of containers, containment systems, or cracks in protective coating or foundations caused by corrosion, mishandling, or other factors	Weekly
	Leaks, spills, accumulated liquids, and open or improperly sealed containers	Daily

HEPA – High efficiency particulate air

[2]When waste management activities occur

I.1.5 Instrumentation Monitoring

Continuous monitoring applies to the electronic monitoring performed in the 200 Area ETF Control Room for this instrumentation during 200 Area ETF processing operations and/or 2025-E Load-In Station transfers. Data from alarms, leak detectors, and level transmitters are monitored daily in the 200 Area ETF Control Room when waste transfers are not occurring (see C.2.5.1). In cases where this instrumentation is out of service (e.g., calibration, power failures, or maintenance) daily visual inspections will be performed in accordance with WAC 173-303-640, using the alternate methods discussed in Addendum C, Section C.1 for leak detection, Section C.4.3.1.2 for level inspection, and Section C.4.4.2 for overfill prevention will be followed.

In the event the electronic leak detectors or level indicators for Sump Tank 1 or Sump Tank 2 are out of service, daily visual inspections will be performed each operating day (WAC-173-303-640).

Inspections pertaining to instrumentation monitoring is provided in Table I.2.

1 **Table I.2. Inspection Plan for Instrumentation Monitoring**

Item	Inspection	Frequency
2025-ED Load-In Station		
Level alarm LAHH-59A-109/-117	Monitor liquid level in Load-In Tanks TK-109 and TK-117 to prevent overflow	Continuously
Level alarm LSH-59A-003	Monitor liquid level in Load-In Tanks TK-1 to prevent overflow	Continuously
Leak detector	Monitor for leakage in the Load-In Station tank pit sump	Continuously
Main Treatment Train		
Leak detector LAH-20B009	Monitor for leakage in the surge tank drainage sump	Continuously
Level alarm LAH-60A013	Monitor surge tank level to prevent overflow	Continuously
Level alarm LAHL-60C-111	Monitor liquid levels in the pH adjustment tank to prevent overflow	Continuously
Level alarm LAHL-60F-101	Monitor liquid levels in the first RO feed tank to prevent overflow	Continuously
Level alarm LAHL-60F-201	Monitor liquid levels in the second RO feed tank to prevent overflow	Continuously
Level alarms LAHL-60C-211	Monitor liquid levels in the effluent pH adjustment tank to prevent overflow	Continuously
Level transmitter LAHX-60H001A/B/C	Monitor liquid level in verification tanks to prevent overflow	Continuously
Leak detector LAH-20B010	Monitor for leakage in the verification tank drainage sump	Continuously
Secondary Treatment Train		
Level alarm LAHL-60I-001A/B	Monitor liquid levels in secondary waste receiver tanks A and B to prevent overflow.	Continuously
Level alarm LAHL-60J-001A/B	Monitor liquid levels in concentrate tanks A and B to prevent overflow.	Continuously
Level alarm LAHL-60I-107	Monitor liquid levels in the evaporator tank to prevent overflow.	Continuously
Level alarm LAHL-60J-036	Monitor liquid levels in the spray condenser tank to prevent overflow.	Continuously
Level alarm LAHL-60I-108	Monitor liquid levels in the distillate flash tank to prevent overflow.	Continuously
Level alarm LAH-60I-119	Monitor liquid levels in the entrainment separator tank to prevent overflow.	Continuously
Level transmitter LAH-20B001	Monitor liquid level in Sump Tank 1 to prevent overflow.	Continuously
Level transmitter LAH-20B002	Monitor liquid level in Sumo Tank 2 to prevent overflow.	Continuously
Leak detector LAH-20B003	Monitor for leakage to Sump No. 1.	Continuously

Leak detector LAH-20B005	Monitor for leakage to Sump No. 2.	Continuously
Leak detector	Monitor for leakage from pipeline between 200 Area ETF and 2025-ED Load-In Station.	Continuously
Leak detector	Monitor for leakage from pipeline between 200 Area ETF and LERF.	Continuously
Leak detector	Monitor for leakage from pipeline between LERF and the 242-A Evaporator.	Continuously

ADDENDUM J
CONTINGENCY PLAN

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ADDENDUM J
CONTINGENCY PLAN

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FIGURES

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J. CONTINGENCY PLAN

The requirements for a contingency plan at the Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF) are satisfied in the following documents: portions of Hanford Facility Permit (Permit) Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) and this Addendum.

The unit specific building emergency plan also serves to satisfy a broad range of other requirements [e.g., Occupational Safety and Health Administration standards (29 Code of Federal Regulations [CFR] 1910), *Toxic Substance Control Act of 1976* (40 CFR 761) and U.S. Department of Energy Orders]. Therefore, revisions made to portions of this unit specific building emergency plan that are not governed by the requirements of Washington Administrative Code (WAC) 173-303 will not be considered as a modification subject to WAC 173-303-830 or Permit Condition I.C.3.

Table J.1 identifies the sections of the unit specific building emergency plan written to meet WAC 173-303-350(3) contingency plan requirements. In addition, Section 12.0 of the unit specific building emergency plan is written to meet WAC 173-303 requirements identifying where copies of Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) and the building emergency plan are located and maintained on the Hanford Facility. Therefore, revisions to Addendum J require a modification subject to WAC 173-303-830 and/or Permit Condition I.C.3.

Table J.1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

Requirement	Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02)	Building Emergency Plan[1] (HNF-IP-0263-ETF)	Part III, OU-3, LERF & 200 Area ETF, Addendum J
-350(3)(a) - A description of the actions, which facility personnel must take to comply with this section and WAC 173-303-360.	X[2] Section 1.3.4	X[2] Sections 7.1, 7.2 through 7.2.5, and 7.3[3] Sections 4.0 (1st paragraph), 8.2, 8.3, 8.4, 11.0	X[2] Sections J.3.1, J.3.2, through J.3.2.5, and J.3.3[3] Sections J.3, J.3.4, J.3.5, J.3.6, and J.5
-350(3)(b) - A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments.	X[2] Section 1.3.4	X[2, 4] Section 7.2.5.1	X[2,4] Section J.3.2.5.1
-350(3)(c) - A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4).	X Sections 3.2.3, 3.3.1, 3.3.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.1.3, 3.7, and Table 3-1		

Table J.1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

Requirement	Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02)	Building Emergency Plan[1] (HNF-IP-0263-ETF)	Part III, OU-3, LERF & 200 Area ETF, Addendum J
-350(3)(d) - A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810(14)(a)(I)), rather than as part of the permit application.		X[5] Section 3.1, 13.0	X[5] Sections J.2 and J.7
-350(3)(e) - A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.		X Section 9.0	X Section J.4
-350(3)(f) - An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.	X[6] Figure 7-3 and Table 5-1	X[7] Section 1.5	X[7] Section J.1

An "X" indicates requirement applies.

[1]Portions of Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) not enforceable through Appendix A of that document are not made enforceable by reference in the building emergency plan.

[2]Permit Attachment 4, H*anford Emergency Management Plan* (DOE/RL-94-02) contains descriptions of actions relating to the Hanford Site Emergency Preparedness System. No additional description of actions are required if at the site level. If other credible scenarios exist or if emergency procedures at the unit are different, the description of actions contained in the building emergency plan will be used during an event by a building emergency director.

[3]Sections J.1, J.2 through J.2.5, and J.3 of the building emergency plan are those sections subject to the Class 2 "Changes in emergency procedures (i.e., spill or release response procedures)" described in WAC 173-303-830, Appendix I, Section B.6.a.

[4]This requirement only applies to TSD units, which receive shipment of dangerous or mixed waste defined as off-site shipments in accordance with WAC 173-303.

[5]Emergency Coordinator names and home telephone numbers are maintained separate from any contingency plan document, on file in accordance with Permit Condition II.A.4 and are updated, at a minimum, monthly.

[6]The Hanford Facility (site wide) signals are provided in this document. No unit/building signal information is required unless unique devices are used at the unit/building.

[7]An evacuation route for the TSD unit must be provided. Evacuation routes for occupied buildings surrounding the TSD unit are provided through information boards posted within buildings.

J.1 Building Evacuation Routing

Figures J.1 and J.2 provide identification of the primary and secondary staging areas and a general layout of the building 2025-E and LERF and 200 Area ETF. Alternate evacuation routes will be used on a case-by-case basis based on meteorological conditions at the time of the event.

J.2 Building Emergency Director

Emergency response will be directed by the Building Emergency Director (BED) until the Incident Commander (IC) arrives. The Incident Command System and staff with supporting on-call personnel fulfill the responsibilities of the Emergency Coordinator as discussed in WAC 173-303-360.

During events, LERF and 200 Area ETF personnel perform response duties under the direction of the BED. The Incident Command Post (ICP) is managed by the senior Hanford Fire Department official, unless the event is determined to be primarily a security event, in which case the Hanford Fire Department and Hanford Patrol will operate under a unified command system with Hanford Patrol making all decisions pertaining to security. These individuals are designated as the IC and as such, have the authority to request and obtain any resources necessary for protecting people and the environment. The BED becomes a member of the ICP and functions under the direction of the IC. In this role, the BED continues to manage and direct LERF and 200 Area ETF operations.

A listing of BEDs by title, work location, and work telephone numbers is contained in Section J.7 of this plan. The BED is on the premises or is available through an "on-call" list 24 hours a day. Names and home telephone numbers of the BEDs are available from the Patrol Operations Center (POC) in accordance with Permit Condition II.A.4.

J.3 Implementation of the Plan

In accordance with WAC 173-303-360(2)(b) the BED ensures that trained personnel identify the character, source, amount, and areal extent of the release, fire, or explosion to the extent possible. Identification of waste can be made by activities that can include, but are not limited to, visual inspection of involved containers, sampling activities in the field, reference to inventory records, or by consulting with facility personnel. Samples of materials involved in an emergency might be taken by qualified personnel and analyzed as appropriate. These activities must be performed with a sense of immediacy and shall include available information.

The BED shall use the following guidelines to determine if an event has met the requirements of WAC 173-303-360(2)(d):

1. The event involved an unplanned spill, release, fire, or explosion,

AND

2.a The unplanned spill or release involved a dangerous waste, or the material involved became a dangerous waste as a result of the event (e.g., product that is not recoverable.), or

2.b The unplanned fire or explosion occurred at the LERF and 200 Area ETF or transportation activity subject to RCRA contingency planning requirements,

AND

3. Time urgent response from an emergency services organization was required to mitigate the event or a threat to human health or the environment exists.

As soon as possible, after stabilizing event conditions, the BED shall determine, in consultation with the site contractor environmental single point-of-contact, if notification to the Washington State Department of Ecology (Ecology) is needed to meet WAC 173-303-360(2)(d) reporting requirements. If all of the conditions under 1, 2, and 3 are met, notifications are to be made to Ecology. Additional information is found in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 4.2.

If review of all available information does not yield a definitive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions and notifications will be initiated. The BED is responsible for initiating any protective actions based on their best judgment of the incident.

The BED must assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from Hanford Patrol, Hanford Fire Department, or ambulance units is required, the Hanford Emergency Response Number (911 from site office phones/373-0911 from cellular phones) must be used to contact the POC and request the desired assistance. To request other resources or assistance from outside the LERF and 200 Area ETF, the POC business number is 373-3800.

J.3.1 Protective Actions Responses

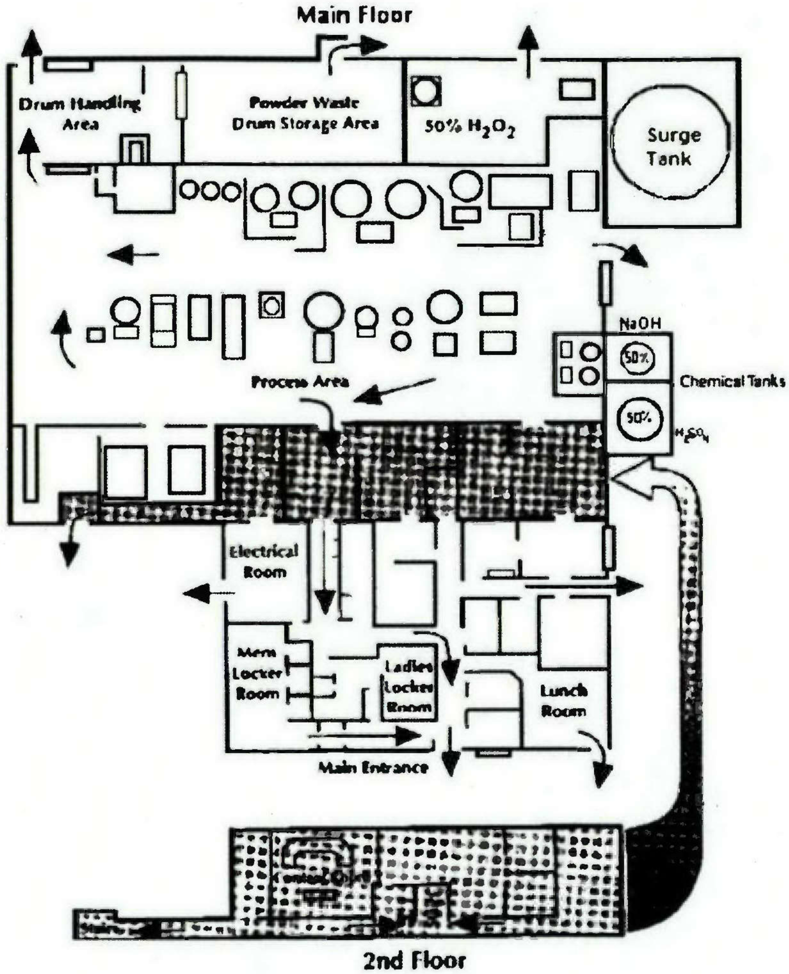
Protective action responses are discussed in the following sections. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

J.3.1.1 Evacuation

The objective of a facility evacuation order is to limit personnel exposure to hazardous materials or dangerous/mixed waste by increasing the distance between personnel and the hazard. The scope of the evacuation includes evacuation of the facility because of an event at the facility as well as evacuation of the facility in response to a site evacuation order. Evacuation will be directed by the BED when conditions warrant and will apply to all personnel not actively involved in the event response or emergency plan related activities.

The BED will initiate the evacuation by directing an announcement be made to evacuate along with the evacuation location over a public address system, facility radios, and, as conditions warrant, by activating the 200 Area site evacuation alarms by calling the POC using 911 from site office phones/373-0911 from cellular phones. Personnel proceed to a predetermined staging area (shown in Figure J.2), or other safe upwind location, as determined by the BED. The BED will determine the operating configuration of the facility and identify any additional protective actions to limit personnel exposure to the hazard.

Emergency organization personnel or assigned operations personnel will conduct a sweep of occupied buildings to ensure that all non-essential personnel and visitors have evacuated. For an immediate evacuation, accountability will be performed at the staging area. The BED will assign personnel as accountability aides and staging managers with the responsibility to ensure that evacuation actions are taken at all occupied buildings at the LERF and 200 Area ETF. All implementing actions executed by the aides/managers are directed by the emergency response procedures. When evacuation actions are complete, the aides/managers will provide a status report to the BED. The BED will provide status to the IC.



1 **Figure J.1. Evacuation Routes from Building 2025E**

2

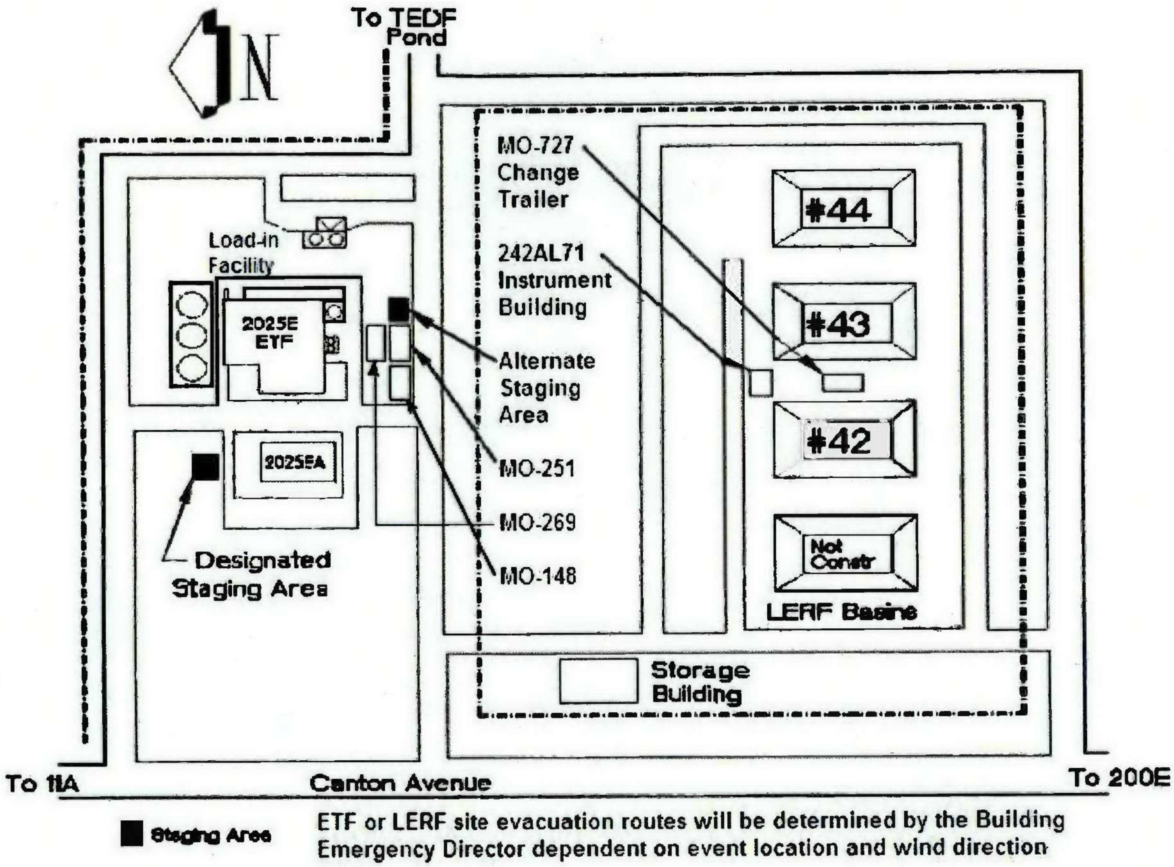


Figure J.2. LERF and 200 Area ETF Site Plan

J.3.1.2 Take Cover

The objective of the take cover order is to limit personnel exposure to hazardous materials, or dangerous/mixed waste when evacuation is inappropriate or not practical. Evacuation might not be practical or appropriate because of extreme weather conditions or the material release might limit the ability to evacuate safely personnel.

The BED will initiate the take cover by directing an announcement be made over the public address system, facility radios, and, as conditions warrant, by activating the 200 Area site take cover alarms by calling the POC using 911 from site office phones/373-0911 from cellular phones). Actions to complete a facility take-cover will be directed by the emergency response procedure. Protective actions associated with operations include configuring, or shutting down, the ventilation systems. Determination of additional take cover response is based on plant operating configuration, weather conditions, amount and duration of release, and other conditions, as applicable to the event and associated hazard. As a minimum, personnel exposure to the hazard will be minimized. The BED will assign personnel as accountability aides with responsibility to ensure that take-cover actions are taken at all occupied buildings at 200 Area ETF. All implementing actions executed by the aides/managers are directed by the emergency response procedure. When take cover actions are complete, the aides/manager will provide the BED with a status report.

J.3.2 Response to Facility Operations Emergencies

Depending on the severity of the following events, the BED reviews the site wide procedures and LERF and 200 Area ETF emergency response procedure(s) and, as required, categorizes and/or classifies the event. If necessary, the BED initiates area protective actions and Hanford Site Emergency Response

Organization activation. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

J.3.2.1 Loss of Utilities

A case-by-case evaluation is required for each event to determine loss of utility impacts. When a BED determines a loss of utility impact, actions are taken to ensure dangerous and/or mixed waste is being properly managed, to the extent possible given event circumstances. As necessary, the BED will stop operations and take appropriate actions until the utility is restored.

J.3.2.2 Major Process Disruption/Loss of Plant Control

The hazards assessment has determined that this occurrence does not pose significant risk to human health or the environment.

J.3.2.3 Pressure Release

The hazards assessment has determined that a pressure release does not pose significant risk to human health or the environment. Hazardous material release and dangerous/mixed waste releases are addressed in Section J.2.5.

J.3.2.4 Fire and/or Explosion

In the event, of a fire, the discoverer activates a fire alarm (pull box); calls 911 from site office phones/373-0911 from cellular phones or verifies that the Hanford Emergency Response Number has been called. Automatic initiation of a fire alarm (through the smoke detectors, and sprinkler systems) is also possible.

- Unless otherwise instructed, personnel shall evacuate the area/building by the nearest safe exit and proceed to the designated staging area for accountability.
- On actuation of the fire alarm, ONLY if time permits, personnel should shut down equipment, secure waste, and lock up classified materials (or hand carry them out). The alarm automatically signals the Hanford Fire Department.
- The BED proceeds directly to the ICP, obtains all necessary information pertaining to the incident, and sends a representative to meet Hanford Fire Department.
- The BED provides a formal turnover to the IC when the IC arrives at the ICP.
- The BED informs the Hanford Site Emergency Response Organization as to the extent of the emergency (including estimates of dangerous waste and mixed waste quantities released to the environment).
- If operations are stopped in response to the fire, the BED ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.
- Hanford Fire Department firefighters extinguish the fire as necessary.

Note: Following a fire and/or explosion, WAC 173-303-640(7) will be addressed for the 200 Area ETF regarding fitness for use.

J.3.2.5 Hazardous Material, Dangerous and/or Mixed Waste Spill

Spills can result from many sources including process leaks, container spills or leaks, damaged packages or shipments, or personnel error. Spills of mixed waste are complicated by the need to deal with the extra hazards posed by the presence of *Atomic Energy Act* materials. These controls include containment berms, dedicated spill control sumps, remote gauges, and level indicators as well as spray shields on chemical pipe flanges. WRPS procedures provide alarm response and maintenance actions for leak detection equipment, surveillance of possible leak locations, and response actions for detected spills.

- The discoverer notifies BED and initiates SWIM response:
  Stops work
  Warns others in the vicinity
  Isolates the area
  Minimizes the exposure to the hazards
- If Operations are stopped, the BED ensures that the plant is put in a safe shutdown configuration.
- The BED determines if emergency conditions exist requiring response from the Hanford Fire Department based on classification of the spill and injured personnel, and evaluates need to perform additional protective actions.
- If the Hanford Fire Department resources are not needed, the spill is mitigated with resources identified in Section J.4 of this plan and proper notifications are made.
- If the Hanford Fire Department resources are needed, the BED calls 911 from site office phones/373-0911 from cellular phones.
- The BED sends a representative to meet the Hanford Fire Department.
- The BED provides a formal turnover to the IC when the IC arrives at the ICP.
- The BED informs the Hanford Site Emergency Response Organization as to the extent of the emergency (including estimates of dangerous waste and mixed waste quantities released to the environment).
- If operations are stopped in response to the spill, the BED ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.
- Hanford Fire Department stabilizes the spill.

Note: For response to leaks or spills and disposition of leaking or unfit-for-use tank systems, refer to WAC 173-303-640(7).

J.3.2.5.1 Damaged, or Unacceptable Shipments

During the course of receiving an onsite transfer of dangerous and/or mixed waste at LERF and 200 Area ETF an unanticipated event could be discovered resulting in a conformance issue concerning the waste. Damaged or unacceptable shipments resulting from onsite transfers are not subject to WAC 173-303-370 however conformance issues must be resolved in order to maintain proper records.

The following actions are taken to resolve the conformance issue:

- Operations management is notified of the damaged or unacceptable waste to be received.
- If the conformance issue results in a spill or release, actions described in Section J.3.2.5 are taken.
- The generating organization is notified of the conformance issue.

An operations representative, in conjunction with the generating organization, determines the course of action to resolve the conformance issue.

J.3.3 Prevention of Recurrence or Spread of Fires, Explosions, or Releases

The BED, as part of the ICP, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The BED will take measures, where applicable, to stop processes and operations, collect and contain released waste, and remove or isolate containers. The BED also monitors for leaks, pressure buildups, gas generation, or ruptures in valves, pipes, or other equipment, whenever this is appropriate.

J.3.4 Incident Recovery and Restart of Operations

A recovery plan is developed when necessary in accordance with Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 9.2. A recovery plan is needed following an event where further risk could be introduced to personnel, the LERF and 200 Area ETF, or the environment through recovery action and/or to maximize the preservation of evidence.

If this plan was implemented according to Section J.3 of this plan, Ecology is notified before operations can resume. The Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 5.1 discusses different reports to outside agencies. This notification is in addition to those required reports and includes the following statements:

- There are no incompatibility issues with the waste and released materials from the incident.
- All the equipment has been cleaned, fit for its intended use, and placed back into service.

The notification required by WAC 173-303-360(2)(j) may be made via telephone conference. Additional information that Ecology requests regarding these restart conditions will be included in the required 15-day report identified in Section J.5 of this plan.

For emergencies not involving activation of the Hanford EOC, the BED ensures that conditions are restored to normal before operations are resumed. If the Hanford Site Emergency Response Organization was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of RL to restore conditions to normal. This process is detailed in RL and contractor emergency procedures. The makeup of this organization depends on the extent of the damage and the effects. The onsite recovery organization will be appointed by the appropriate contractor's management.

J.3.5 Incompatible Waste

After an event, the BED or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Cleanup actions are taken by LERF and 200 Area ETF personnel or other assigned personnel. Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 9.2.3, describes actions to be taken.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility before storage is performed as necessary. Incompatible wastes are not placed in the same container. Containers of waste are placed in storage areas appropriate for their compatibility class.

If incompatibility of wastes was a factor in the incident, the BED or the onsite recovery organization ensures that the cause is corrected.

J.3.6 Post Emergency Equipment Maintenance and Decontamination

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumable and disposed materials are restocked. Fire extinguishers are replaced.

The BED ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished; protective clothing is cleaned or disposed of and restocked, etc.

J.4 Emergency Equipment

Emergency resources and equipment for the LERF and 200 Area ETF are presented in this section.

J.4.1 Fixed Emergency Equipment

Type	Location	Capability
Safety shower/eye wash stations (200 Area ETF only)	• 2025-E Rm 112 Laboratory • 2025-E Rm 122 Decon Station • 2025-E Rm 131, South Process Area • 2025-E Rm 134, Air Compressor Room • 2025-E Concentrated acid/caustic tank area (outside) • 2025-ED Load-In Station (outside)	Assist in flushing chemicals/ materials from the body and/ or eyes and face of personnel.
Wet pipe sprinkler (200 Area ETF only)	Throughout building 2025-E except those areas protected by preactive sprinklers	Assist in the control of a fire.
Preactive sprinkler (200 Area ETF only)	200 Area ETF Control Room, communications room, electrical equipment room	Assist in the control of a fire. Maintained dry to prevent accidental damage to equipment
Fire alarm pull boxes (200 Area ETF only)	All high traffic areas in operations administration and support areas, truck bay, and process area	Activate the local fire alarm
E-lights	Throughout 200 Area ETF	1 hour temporary lighting

J.4.2 Portable Emergency Equipment

Type	Location	Capability
Fire extinguisher ABC type	Throughout 200 Area ETF (Administrative/Support areas), LERF, and TEDF	Fire suppression for Class A, B, and C fires
Fire extinguisher BC type	Throughout 200 Area ETF (process area and electrical room)	Fire suppression for Class B and C fires
Portable safety showers and Eye Wash Stations	As needed for special evolutions and maintenance	Assist in flushing chemicals/ materials from the body and/or eyes and face of personnel.

J.4.3 Communications Equipment/Warning Systems

Type	Location	Capability
Fire alarms (200 Area ETF only)	Corridors, locker rooms, process area, drum storage, and truck bay	Audible throughout 200 Area ETF
Take cover/evacuation	Throughout the 200 Area ETF	Audible outside buildings and inside administrative buildings
Public address system (200 Area ETF Only)	Throughout the 200 Area ETF	Audible throughout 200 Area ETF
Portable radios	Operations and maintenance personnel	Communication to 200 Area ETF Control Room
Telephone	• **200 Area ETF:** Control Room, 2025-E, 2025-EA offices, MO-148, MO-269, MO-251, 2025-EC-71. • **LERF:** MO-727 and 242AL71 instrument building, LERF Garage 242AL11 • **TEDF:** 225-E (pump house 1), 225W (pump house 2), 6653 (sample building), 6653-A (pump house 3)	Internal and external communications. Allows notification of outside resources (POC, HFD, Hanford Patrol, etc.

Note: Sitewide communications and warning systems are identified in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Table 5.1.

J.4.4 Personal Protective Equipment

Type	Location	Capability
Acid suits	In the spill response cabinets in 2025E	Chemical protection for personnel during containment and isolation
Respirators	2025-E, 1st Floor	Filtered air for recovery of known hazards

J.4.5 Spill Control and Containment Supplies

Type	Location	Capability
Spill bags, drums, carts, etc.	• 2025-E in process area • 2025-E upper level process area • 2025-E Rm 125A • 2025-ED Load-In Station • TEDF 6653 Disposal Building	Support containment and cleanup of hazardous material spills
Spill response cabinet	• 2025-E Rm 122 • container storage CONEX East of 2025E building within the TSD unit boundary • outside southeast side of 2025E • TEDF 6653 Disposal Building • MO-727 Change Trailer	Support equipment for spill response

J.4.6 Incident Command Post

The ICPs for the LERF and 200 Area ETF are in the 200 Area ETF Control Room or 2025-EA. Emergency resource materials are stored at each location. The IC could activate the Hanford Fire Department Mobile Command Unit if necessary.

J.5 Required Reports

Post incident, written reports are required for certain incidents on the Hanford Site. The reports are described in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 5.1.

Facility management must note in the Hanford Facility Operating Record, LERF & 200 Area ETF File, the time, date and details of any incident that requires implementation of the contingency plan (refer to Section J.3). Within 15 days after the incident, a written report must be submitted to Ecology. The report must include the elements specified in WAC 173-303-360(2)(k).

J.6 Plan Location and Amendments

Copies of this plan are maintained at the following locations:

- 200 Area ETF Control Room
- Building 2025EA ICP

This plan will be reviewed and immediately amended as necessary, in accordance with Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 14.3.1.1.

J.7 Facility/Building Emergency Response Organization

LERF and 200 Area ETF Building Emergency Directors		
Title	**Work Location**	**Work Phone**
Shift Operation Manager (SOM)	2025-E Building	373-9000 or 373-9500

Names and home telephone numbers of the BEDs are available from the POC (373-3800) in accordance with Permit Condition II.A.4.

Waste Treatment & Immobilization Plant

Change Control Log

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated and transparent manner. Each unit addendum will have a "**Last Modification Date**" which represents the last date the portion of the unit has been modified. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Last modification to Waste Treatment & Immobilization Plant **August 25, 2016**

Chapters	Last Modification Date	Modification Number
Statement of Basis (Fact Sheet)	10/2013	
Response to Comments	03/2014	
Focus Sheet: Waste Treatment Plant Design Changes	10/2013	
Issuance Letter (5/15/2014)	05/15/2014	
Conditions	08/25/2016	8c.2016.Q2
1.0 Part A Form	09/2008	
2.0 Topographic Map	09/2007	
3.0 Waste Analysis Plan	06/2011	
3A WTP WAP	03/2007	
3B Quality Assurance Project Plan	03/2007	
4.0 Process Information	06/20/2016	8c.2016.4F
4A Figures and Drawings	08/2012	
4C Compliance with Uniform Building Code Seismic Design Requirements	11/17/2008	
5.0 Reserved		
6.0 Procedures to Prevent Hazards	08/2011	
6A Inspection Schedule	08/2011	
7.0 Contingency Plan	08/2011	
7A Emergency Response	06/2011	
8.0 Personnel Training	06/2011	
9.0 Reserved		
10.0 Reserved		
11.0 Closure Plan	05/23/2016	8c.2016.Q1
11A Sampling and Analysis Plan for Closure of WTP Facility	05/23/2016	8c.2016.Q1
12.0 Reporting and Recordkeeping	08/2011	

Appendices	Last Modification Date	Modification Number
Appendices 1: Compliance Schedule	09/30/2015	8c.2015.Q3
Appendices 2: Critical Systems	03/2014	
Appendices 3: Reserved		
Appendices 4: Reserved		
Appendices 5: Reserved		
Appendices 6: Risk Assessment	01/28/2016	8c.2016.1F
Appendices 7: Common Drawing, Documents, and Other Information	06/20/2016	8c.2015.4F
Appendices 8: Pretreatment Facility	09/30/2015	8c.2015.Q3
Appendices 9: Low-Activity Waste Building	06/20/2016	8c.2016.4F
Appendices 10: High-Level Waste Building	09/30/2015	8c.2015.Q3
Appendices 11: Laboratory Building	05/15/2014	
Appendices 12: Balance of Facilities	09/30/2015	8c.2015.Q3

PART III, OPERATING UNIT GROUP 10 – SPECIFIC CONDITIONS
WASTE TREATMENT AND IMMOBILIZATION PLANT

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PART III, OPERATING UNIT GROUP 10 – SPECIFIC CONDITIONS WASTE TREATMENT AND IMMOBILIZATION PLANT

The Waste Treatment and Immobilization Plant (WTP) is the operating treatment and storage unit designed to treat the mixed (radioactive and dangerous) waste currently stored in underground tanks at the Hanford Site. Once the mixed waste is received at the WTP, it will be separated into High-level and Low-activity waste streams in the Pretreatment Building. The waste streams are then transferred to either the High-level Waste Building or the Low-Activity Waste Building, mixed with glass forming additives and heated to 950-1250°C in melters, and then poured into containers. As the containerized waste cools, it is immobilized in the glass matrix. Once the waste is immobilized, the container is finished (i.e. provided with a lid and decontaminated), and then transported from the WTP for disposal.

III.10.A COMPLIANCE WITH APPROVED PERMIT

The Permittees shall comply with all requirements set forth in the Hanford Facility RCRA Dangerous Waste Permit including all approved modification. All chapters, subsection, files, tables, addendums, and appendices included in the following unit-specific Conditions are enforceable in their entirety. In the event that a Unit-Specific Condition conflicts with Permit Conditions in Parts I or II of this Permit, the Unit-Specific Conditions shall prevail.

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, special nuclear material (as defined by the Atomic Energy Act of 1954, as amended) and/or the radionuclide component of mixed waste has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 RCW. In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

OPERATING UNIT GROUP 10

Addendum A	Part A, Form 3 Permit Application, Revision 1 (October 2008)
Addendum B	Waste Analysis Plan
	Addendum B1 Waste Treatment Plant Waste Analysis Plan
	Addendum B2 Quality Assurance Project Plan for Waste Analysis Plan
Addendum C	Process Information
	Addendum C1 Engineering Figures
	Addendum C2 Supplement 1 RPP-WTP Compliance with Uniform Building Code Seismic Design
Addendum D	Groundwater Monitoring (RESERVED)
Addendum E	Procedures to Prevent Hazards
	Addendum E1 Inspection Schedule
Addendum F	Contingency Plan
	Addendum F1 RPP-WTP Emergency Response Plan
Addendum G	Personnel Training
Addendum H	Closure
Appendix 1.0	Compliance Schedule

Appendix 2.0	Critical Systems
Appendix 3.0	RESERVED
Appendix 4.0	RESERVED
Appendix 5.0	RESERVED
Appendix 6.0	Risk Assessment
Appendix 6.0, §6.1	Environmental Risk Assessment Work Plan
Appendix 6.0, §6.1.1	Previously Submitted Preliminary Risk Assessment Work Plan
Appendix 6.0, §6.1.2	Documentation of Revisions to Preliminary Risk Assessment Work Plan
Appendix 6.0, §6.2	Final Risk Assessment Work Plan
Appendix 6.0, §6.3	Pre-Demonstration Test Risk Assessment Report (RESERVED)
Appendix 6.0, §6.3.1	Basis and Assumptions (RESERVED)
Appendix 6.0, §6.4	Final Risk Assessment Report (RESERVED)
Appendix 6.0, §6.4.1	Basis and Assumptions (RESERVED)
Appendix 7.0	WTP Documents Applicable to All Regulated Areas
Appendix 7.0, §7.1	Process Flow Diagrams
Appendix 7.0, §7.2	Piping and Instrumentation Diagrams & Related Documents
Appendix 7.0, §7.3	System Description Documentation (RESERVED)
Appendix 7.0, §7.4	General Arrangement Drawings (RESERVED)
Appendix 7.0, §7.5	Civil, Structural, and Architectural Criteria and Typical Design Details
Appendix 7.0, §7.6	Mechanical Drawings (RESERVED)
Appendix 7.0, §7.7	Specifications
Appendix 7.0, §7.8	Engineering Calculations (RESERVED)
Appendix 7.0, §7.9	Material Selection and Corrosion Evaluation Documentation
Appendix 7.0, §7.10	Critical Systems Equipment/Instrument List (RESERVED)
Appendix 7.0, §7.11	IQRPE Reports
Appendix 7.0, §7.12	Installation Plans
Appendix 7.0, §7.13	Instrument Control Logic and Narrative Description (RESERVED)
Appendix 7.0, §7.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 7.0, §7.15	Operating Documents
Appendix 8.0	Pretreatment Building
Appendix 8.0, §8.1	Process Flow Diagrams
Appendix 8.0, §8.2	Piping and Instrumentation Diagrams
Appendix 8.0, §8.3	System Description Documentation (RESERVED)
Appendix 8.0, §8.4	General Arrangement Drawings
Appendix 8.0, §8.5	Civil, Structural, and Architectural Criteria and Typical Design Details

Appendix 8.0, §8.6	Mechanical Drawings
Appendix 8.0, §8.7	Specifications
Appendix 8.0, §8.8	Engineering Calculations
Appendix 8.0, §8.9	Material Selection and Corrosion Evaluation Documentation
Appendix 8.0, §8.10	Critical Systems Equipment/Instrument List
Appendix 8.0, §8.11	IQRPE Reports
Appendix 8.0, §8.12	Installation Plans (RESERVED)
Appendix 8.0, §8.13	Instrument Control Logic and Narrative Description
Appendix 8.0, §8.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 8.0, §8.15	Operating Documents (RESERVED)
Appendix 9.0	LAW Building
Appendix 9.0, §9.1	Process Flow Diagrams
Appendix 9.0, §9.2	Piping and Instrumentation Diagrams
Appendix 9.0, §9.3	System Description Documentation (RESERVED)
Appendix 9.0, §9.4	General Arrangement Drawings
Appendix 9.0, §9.5	Civil, Structural, and Architectural Criteria and Typical Design Details
Appendix 9.0, §9.6	Mechanical Drawings
Appendix 9.0, §9.7	Specifications
Appendix 9.0, §9.8	Engineering Calculations
Appendix 9.0, §9.9	Material Selection and Corrosion Evaluation Documentation
Appendix 9.0, §9.10	Critical Systems Equipment /Instrument List
Appendix 9.0, §9.11	IQRPE Reports
Appendix 9.0, §9.12	Installation Plans (RESERVED)
Appendix 9.0, §9.13	Instrument Control Logic, and Narrative Description
Appendix 9.0, §9.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 9.0, §9.15	Demonstration Test Plan (RESERVED)
Appendix 9.0, §9.16	Demonstration Test Report (RESERVED)
Appendix 9.0, §9.17	Treatment Effectiveness Report (RESERVED)
Appendix 9.0, §9.18	Operating Documents
Appendix 10.0	HLW Building
Appendix 10.0, §10.1	Process Flow Diagrams
Appendix 10.0, §10.2	Piping and Instrumentation Diagrams
Appendix 10.0, §10.3	System Description Documentation (RESERVED)
Appendix 10.0, §10.4	General Arrangement Drawings
Appendix 10.0, §10.5	Civil, Structural, and Architectural Criteria and Typical Design Details

Appendix 10.0, §10.6	Mechanical Drawings
Appendix 10.0, §10.7	Specifications
Appendix 10.0, §10.8	Engineering Calculations
Appendix 10.0, §10.9	Material Selection and Corrosion Evaluation Documentation
Appendix 10.0, §10.10	Critical Systems Equipment/Instrument List
Appendix 10.0, §10.11	IQRPE Reports
Appendix 10.0, §10.12	Installation Plans (RESERVED)
Appendix 10.0, §10.13	Instrument Control Logic and Narrative Description
Appendix 10.0, §10.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 10.0, §10.15	Demonstration Test Plan (RESERVED)
Appendix 10.0, §10.16	Demonstration Test Report (RESERVED)
Appendix 10.0, §10.17	Treatment Effectiveness Report (RESERVED)
Appendix 10.0, §10.18	Operating Documents
Appendix 11.0	Laboratory Building
Appendix 11.0, §11.1	Process Flow Diagrams
Appendix 11.0, §11.2	Piping and Instrumentation Diagrams
Appendix 11.0, §11.3	System Description Documentation (RESERVED)
Appendix 11.0, §11.4	General Arrangement Drawings
Appendix 11.0, §11.5	Civil, Structural, and Architectural Criteria and Typical Design Details
Appendix 11.0, §11.6	Mechanical Drawings
Appendix 11.0, §11.7	Specifications (RESERVED)
Appendix 11.0, §11.8	Engineering Calculations
Appendix 11.0, §11.9	Material Selection and Corrosion Evaluation Documentation
Appendix 11.0, §11.10	Critical Systems Equipment/Instrument List
Appendix 11.0, §11.11	IQRPE Reports
Appendix 11.0, §11.12	Installation Plans (RESERVED)
Appendix 11.0, §11.13	Instrument Control Logic and Narrative Description
Appendix 11.0, §11.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 11.0, §11.15	Operating Documents (RESERVED)
Appendix 12.0	Balance of Facilities
Appendix 12.0, §12.1	Process Flow Diagrams (RESERVED)
Appendix 12.0, §12.2	Piping and Instrumentation Diagrams (RESERVED)
Appendix 12.0, §12.3	System Description Documentation (RESERVED)
Appendix 12.0, §12.4	General Arrangement Drawings (RESERVED)

Appendix 12.0, §12.5	Civil, Structural, and Architectural Criteria and Typical Design Details (RESERVED)
Appendix 12.0, §12.6	Mechanical Drawings (RESERVED)
Appendix 12.0, §12.7	Specifications (RESERVED)
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Appendix 12.0, §12.9	Material Selection and Corrosion Evaluation Documentation (RESERVED)
Appendix 12.0, §12.10	Critical Systems Equipment/Instrument List (RESERVED)
Appendix 12.0, §12.11	IQRPE Reports (RESERVED)
Appendix 12.0, §12.12	Installation Plans (RESERVED)
Appendix 12.0, §12.13	Instrument Control Logic and Narrative Description (RESERVED)
Appendix 12.0, §12.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 12.0, §12.15	Operating Documents (RESERVED)

Facility-Specific Definitions

The following definitions are specific to the WTP Unit:

Ash: means a measure of the contribution of particulate matter from the melter feeds to the melter off-gas, as determined by representative sampling and analysis of the melter feed using ASTM MethodD-482, or an equivalent method.

Batch: refers to waste staged in one DST designated as mixed waste for transfer to the WTP Unit for treatment.

Continuous monitoring system: means using a device which continuously samples the regulated parameter specified on Permit Tables III.10.H.F, III.10.I.F, III.10.J.F, and III.10.K.F, with the exception of pressure, without interruption, evaluates the detector response at least once every fifteen (15) seconds and computes and records the average value at least every sixty (60) seconds, except during allowable periods of calibration and except as defined otherwise by the CEMS Performance Specifications in 4B and 8A in Appendix B, 40 CFR Part 60. For the parameter pressure, the term "continuous monitoring system" means using a device that continuously samples the pressure without interruption and evaluates the detector response without averaging at least once each second and records the value at least every sixty (60) seconds. In addition, if the AWFCO is engaged due to a pressure exceedance, the pressure value must be recorded.

Cascade event: means when additional waste feed cut-off parameter set points deviate outside the limits specified in Permit Tables III.10.H.F, III.10.I.F, III.10.J.F, and III.10.K.F after waste feed is cut-off, but while waste or waste residues are being managed in HLW and LAW.

Critical System: as applied to determining whether a Permit Modification is required, means those specific portions of a TSD unit's structure, or equipment, whose failure could lead to the release of dangerous waste into the environment, and/or systems which include processes which treat, transfer, store, or dispose of regulated wastes. A list identifying the critical systems for the WTP is included in Appendix 2.

Dangerous and/or mixed waste management unit: means dangerous and/or mixed waste management units, areas, systems, and sub-systems as defined in Permit Tables III.10.D.A, III.10.E.A through D, III.10.F.A, III.10.G.A, III.10.H.A, III.10.I.A, III.10.J.A, and III.10.K.A.

Dioxin/furan" and "dioxins and furans: means tetra-, penta-, hexa-, hepta-, and octa-chlorinated dibenzo dioxins and furans.

HLW Vitrification System: is defined as specified on Permit Tables III.10.J.A and B, and III.10.K.A and B.

Hourly rolling average or HRA: will mean the arithmetic mean of the sixty (60) most recent one-minute readings recorded by the continuous monitoring system.

LAW Vitrification System: is defined as specified on Permit Tables III.10.H.A and B, and III.10.I.A and B.

Mode of operation: means operation of the LAW Vitrification System or the HLW Vitrification System within set limits for each operating parameter specified in Permit Tables III.10.H.D and F (for LAW) and Permit Tables III.10.I.D and F (for HLW).

One-minute average: means the average of detector responses calculated at least every sixty (60) seconds from responses obtained at least every fifteen (15) seconds.

Permittees: means the United States Department of Energy (owner/operator) and Bechtel National, Inc. (Co-operator).

Pretreatment Plant Miscellaneous Unit Systems: is defined as specified on Permit Tables III.10.G.A and B.

Primary sump: means any pit or reservoir that meets the WAC 173-303-040 definition of "tank," and those troughs/trenches connected to it, that serve to collect dangerous/hazardous waste, deliberately introduced (e.g., from decontamination or treatment activities), for transport to TSD facilities.

Rolling average: means the average of all one-minute averages over the averaging period.

Secondary sump: means any pit or reservoir that meets the WAC 173-303-040 definition of "tank," and those troughs/trenches connected to it, that serve to collect dangerous/hazardous waste, not deliberately introduced (e.g., from spills, leaks, or overflows), for transport to TSD facilities.

Secondary mixed waste stream: means treatment residues and materials derived from the treatment of mixed waste which continue to designate as a dangerous, extremely hazardous, or acutely hazardous waste and contains a radioactive component.

Standard operating procedure or SOP: will mean a written description of the procedures by which a process, equipment, etc. will be operated. An SOP may be written by the manufacturer and/or the Permittees.

Successful completion of the demonstration test: will mean operations including a minimum of three test runs without significant interruptions (i.e., once initiated, each test run must be continuous, and the samples have been preserved and maintained intact, and one in which sampling of exhaust gas was representative of the LAW Vitrification System or HLW Vitrification System Operations, whichever is applicable, and adequate to achieve evaluation of PODCs destruction and removal efficiency (DRE) to 99.99%).

TEQ or "toxic equivalents": refer to the sum of the weighted potencies of 7 polychlorinated dibenso-p –dioxins (PCDDs), 10 polychlorinated dibensofurans (PCDFs), and 12 dioxin-like (coplanar) polychlorinated biphenyl (PCBs), relative to a reference compound, 2, 3, 7, 8 – tetrachlorodibenzo-p-dioxin (2, 3, 7, 8 –TCDD).

Pre-process: means prior to introduction into a dangerous or mixed waste management unit at the WTP Unit.

In-process: means duration of a waste in a dangerous or mixed waste management unit at the WTP Unit.

Post-process: means prior to the introduction into a subsequent dangerous or mixed waste management unit at the WTP Unit or prior to shipment from the WTP Unit.

Vendor information: means documentation prepared by a vendor (e.g., catalog cut sheets) for plant items that are routinely manufactured and stocked by vendors (i.e., items that are considered "off the shelf") and are not being procured in accordance with Permittees' engineering drawings and specifications. Documentation such as catalog cut sheets will be annotated to specify selected items which meet Permittee's procurement requirements equipment specification. Documentation associated with "one of a kind", custom items, and commercial grade items (e.g., bulk pipe, valves) that will be procured in accordance with the Permittees engineering drawings and specifications is not considered vendor information. Changes to the drawings and specifications may require a permit modification.

Vitrification System Shutdown: means emergency and planned shutdowns of the vitrification system as defined in the operating procedure(s).

Vitrification System Startup: means startup of the vitrification system as defined in operating procedure(s).

FACILITY-SPECIFIC ACRONYMS

The following acronyms are specific to the WTP Unit:

AWFCO	Automatic Waste Feed Cut-off
CDR	Construction Deficiency Report
CEMS	Continuous Emissions Monitoring System
CMS	Continuous Monitoring System
CNP	Cesium Nitric Acid Recovery Process System
CRP	Cesium Resin Addition Process System
CPE	Cathodic Protection Electrical System
CXP	Cesium Ion Exchange Process System
DFETP	Dioxin and Furan Emission Test Plan
DRE	Destruction and Removal Efficiency
Dscf	Dry standard cubic feet
ERP	Emergency Response Plan
FEP	Waste Feed Evaporation Process System
FRP	Waste Feed Receipt Process System
HCP	HLW Concentrate Receipt Process System
HDH	HLW Canister Decontamination Handling System
HEH	HLW Canister Export Handling System
HEME	High Efficiency Mist Eliminator
HEPA	High Efficiency Particulate Air Filter
HFH	HLW Filter Cave Handling System
HFP	HLW Melter Feed Process System
HLP	HLW Lag Storage and Feed Blending Process System
HLW	High-level Waste

HMH	HLW Melter Handling System
HMP	HLW Melter Process System
HOP	HLW Vit Primary Offgas Treatment System
HPH	HLW Canister Pour Handling System
HSH	HLW Melter Cave Support Handling System
IHLW	Immobilized High-Level Waste (Glass)
ILAW	Immobilized Low-Activity Waste (Glass)
IQRPE	Independent, qualified, registered, professional engineer
LAB	WTP Laboratory Building
LAW	Low Activity Waste
LCP	LAW Concentrate Receipt Process System
LEH	LAW Container Export Handling System
LFH	LAW Canister Finishing Handling System
LFP	LAW Melter Feed Process System
LMH	LAW Melter Handling System
LMP	LAW Melter Process System
LOP	LAW Primary Offgas Process System
LPH	LAW Container Pour Handling System
LSH	LAW Melter Equipment Support Handling System
LSM	Locally Shielded Melter
LVP	LAW Secondary Offgas/Vessel Vent Process System
NCR	Nonconformance Report
PFH	Pretreatment Filter Cave Handling System
PIH	Pretreatment In-Cell Handling System
PJV	Pulse Jet Ventilation System
PODC	Principal Organic Dangerous Constituents
PTF	Pretreatment Building
PVP	Pretreatment Vessel Vent Process System
PVV	Process Vessel Vent System
PWD	Plant Wash and Disposal System
RDP	Spent Resin and Dewatering Process System
RDTP	Revised Demonstration Test Plan
RLD	Radioactive Liquid Waste Disposal System
RPP-WTP	River Protection Project-Waste Treatment Plant
RWH	Radioactive Solid Waste Handling System

SBS	Submerged Bed Scrubber
TCP	Treated LAW Evaporation Process System
TLP	Treated LAW Evaporation System
TOC	Total Organic Carbon
TXP	Technetium Ion Exchange Process System
TEP	Technetium Eluant Recovery Process System
UFP	Ultrafiltration Process System
WESP	Wet Electrostatic Precipitator
WTP	River Protection Project – Waste Treatment and Immobilization Project (also known as the Waste Treatment Plant and Vitrification Plant)
6% Mo	Six Percent Molybdenum Alloy
304L	ASTM A240 Grade 304L Stainless Steel
316L	ASTM A240 Grade 316L Stainless Steel

III.10.A COMPLIANCE WITH APPROVED PERMIT

III.10.B STANDARD CONDITIONS AND GENERAL FACILITY CONDITIONS

In addition to the conditions in this chapter, the Permittees must comply with all the applicable portions of the Dangerous Waste Permit for the Hanford Facility. In the event that a Unit-Specific Condition for the WTP Unit in Permit Conditions III.10.C. through III.10.K. conflicts with a general condition in Permit Conditions I and II of this permit, the Unit-Specific Condition will apply to the WTP Unit.

III.10.C UNIT-SPECIFIC CONDITIONS FOR THE WTP UNIT

III.10.C.1 RESERVED

III.10.C.2 General Waste Management

III.10.C.2.a Treatment or storage of dangerous waste or mixed waste in any new or modified portion of the facility may commence when the Permittees have submitted to Ecology, by certified mail, or hand delivery, a letter signed by the Permittees and a Registered Professional Engineer stating that the facility has been constructed or modified in compliance with the Permit in accordance with WAC 173-303-810(14)(a); and

III.10.C.2.a.i The Permittee has received a Permit modification approval pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g., and

III.10.C.2.a.ii Ecology has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the Permit, or

III.10.C.2.a.iii Within fifteen days, of the date of submission of the Permittees' letter, Ecology has not notified the Permittees of intent to inspect.

III.10.C.2.b The Permittees are authorized to accept the dangerous and/or mixed waste specified in Operating Unit Group 10, Addendum A (Part A Form 3), and Addendum B (Waste Analysis Plan [WAP]).

III.10.C.2.c All dangerous and/or mixed waste must be managed only in areas authorized for dangerous and/or mixed waste management under the Permit conditions, except as allowed under WAC 173-303-200.

The authorized dangerous and/or mixed waste management areas of the WTP Unit are specified in Conditions III.10.D through III.10.K.

III.10.C.2.d Dangerous and/or mixed waste may be transferred from dangerous waste management units within the WTP operating unit to an on-site dangerous waste management unit or an off-site permitted TSD Facility using the manifest/tracking system required by permit condition II.N.

III.10.C.2.e Permit modifications pursuant to this Permit for dangerous and/or mixed waste at the request of the Permittees must be done according to the three tiered modification system specified in WAC 173-303-830(4) and Condition I.C.3. The Permit modification request must include page changes to the Permit, attachments, and permit application supporting documentation necessary to incorporate the proposed permit modification.

III.10.C.2.f In addition to other requirements in WAC 173-303-830, within forty-five (45) days of a permit change (i.e., permit modification) being put into effect or approved, the Permittees will provide copies of the Permit attachments to incorporate the change (if not already reflected in the change pages submitted in the original permit modification request). This submittal does not require re-certification in accordance with WAC 173-303-810(13).

III.10.C.2.g Permit modifications pursuant to Operating Unit Group 10, Appendix 1.0 will be prepared and issued pursuant to WAC 173-303-830(3)(a)(ii) and WAC 173-303-840.

III.10.C.2.h The Permittees must complete Compliance Schedule interim requirements as specified in Operating Unit Group 10, Appendix 1.0. If an interim requirement is not completed as specified, the Permittees will, within 14 days, notify Ecology in writing of its non-compliance. The notification will include the following:

III.10.C.2.h.i A description of any portion of the interim requirement completed;

III.10.C.2.h.ii Summaries of any problems affecting timely completion of the interim requirement;

III.10.C.2.h.iii A description of the plans for completing the remaining portion of the interim requirement, including any alternatives;

III.10.C.2.h.iv Projected interim requirement completion date.

III.10.C.2.i RESERVED

III.10.C.2.j RESERVED

III.10.C.2.k RESERVED

III.10.C.2.l During demonstration testing of the LAW Vitrification System and HLW Vitrification System, pursuant to Permit Sections III.10.H. and J., processing of materials in the LAW and HLW Vitrification Systems that would designate as dangerous waste are fully subject to the requirements of this Permit, excluding the melter feed system as identified in Tables III.10.H.A. and III.10.J.A., respectively. This exclusion does not apply to mixed waste.

III.10.C.2.m The Facility Owner will ensure WTP input is provided to the risk budget tool developed in accordance with permit condition III.11.I.5.

III.10.C.2.n The Permittees will submit the following reports, based on the August 2006 mass balance submitted to Ecology (DOE Letter 06-ESQ-081), for Ecology's review and comment/resolution. Updated information to the August 2006 Mass Balance may be used if available and mutually agreed upon by the Permittees and Ecology.

The reports will describe all of the treatment approaches identified in Permit Conditions III.10.C.2.n.i through III.10.C.2.n.v, and will be included in the administrative record.

III.10.C.2.n.i By June 30, 2010, the Permittees will perform an assessment that projects mixed waste constituents and the concentrations that are expected to be contained in each secondary mixed waste stream anticipated to be generated;

III.10.C.2.n.ii By June 30, 2010, the Permittees will identify appropriate LDR treatment standards for each mixed waste stream identified in Permit Condition III.10.C.2.n.i;

III.10.C.2.n.iii By June 30, 2010, the Permittees will identify which mixed waste streams that, from a qualitative risk perspective, reasonably may cause or may significantly contribute to an exceedance of applicable environmental standards at a disposal facility; and

III.10.C.2.n.iv By June 30, 2010, the Permittees will, for the mixed waste streams identified in Permit Condition III.10.C.2.n.iii, identify potential treatment approaches that mitigate their environmental impacts;

III.10.C.2.n.v By December 31, 2015 or 12 months prior to cold commissioning of the facility producing the waste, whichever is earlier, the Permittees will, for the mixed waste streams identified in Permit Condition III.10.C.2.n.iii, select appropriate treatment approaches that mitigate their environmental impacts.

III.10.C.2.o The Facility owner will evaluate all waste streams generated at the WTP for potential exceedances of applicable environmental standards and will ensure all mixed and dangerous waste streams generated at the WTP will not cause an exceedance of applicable environmental standards at an appropriate disposal facility on-site and is subject to the following requirements:

III.10.C.2.o.i ILAW glass will be engineered to be compliant with the disposal facility Waste Acceptance Criteria (WAC). The waste feed and ILAW glass recipes will be verified to be compliant with the permitted glass formulations (including planning for pertinent operating parameters) prior to vitrification.

III.10.C.2.o.ii Treatment methods for secondary waste streams projected to be generated by the WTP that are slated for disposal at the Hanford Site will be engineered to ensure that treated secondary wastes will comply with the on-site disposal facility WAC and applicable LDRs prior to generation. Prior to treatment, secondary wastes must be evaluated to ensure that selected treatment methods are still appropriate and continue to comply with the on-site disposal facility WAC and applicable LDRs; and

III.10.C.2.o.iii On a case-by-case basis, for any WTP mixed waste that does not meet the WAC for the disposal facility, Ecology will approve or deny acceptance of that waste into the disposal facility. This decision will be based on the disposal facility's WAC and compliance with WAC 173-303-140.

III.10.C.3 Waste Analysis

III.10.C.3.a RESERVED

III.10.C.3.b RESERVED

III.10.C.3.c The Permittees are responsible for obtaining accurate information for each waste stream. Inaccurate waste analysis information provided by the generating site (or unit) is not a defense for noncompliance by the Permittees with conditions of this Permit.

III.10.C.3.d Records and results of waste analyses conducted under the WAP will be maintained in accordance with Permit Condition II.I.1.

The WTP Unit operating record will include, but not be limited to, information requirements for monitoring in Permit Conditions I.F.1, I.F.2, and I.F.3.

III.10.C.3.e Prior to the initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology for review and approval a revised WAP and the Quality Assurance Project Plan (QAPjP) pursuant to Conditions III.10.C.2.e and III.10.C.2.f, and the Compliance Schedule in Operating Unit Group 10, Appendix 1.0. The revised WAP and QAPjP will include:

III.10.C.3.e.i All the elements listed in WAC 173-303-300(5), and Permit Condition II.D.1.

III.10.C.3.e.ii Requirements that characterization will be performed on the waste feed prior to transfer to the WTP Unit in conformance with the regulatory data quality objectives identified in the Regulatory DQO Optimization Report (24590-WTP-RPT-MGT-04-001, Rev 0), or any other parameters, and the rational for selecting these parameters. Requirements that the following analyses, at a minimum, will be conducted on each new batch prior to waste transfer to the WTP Unit, in accordance with the methods under WAC 173-303-110: Ammonia, pH, metals, organic acids, mercury, cyanide, volatiles, semi-volatiles, PCBs/pesticides, anions, TOC, and compatibility (ASTM Method D5058-90). For the purposes of this Permit Condition, a "new batch" is one that has been sampled and analyzed in accordance with the Regulatory DQO Optimization Report (24590-WTP-RPT-MGT-04-001, Rev 0), and has received no further additions. Further additions require the Permittees to resample and reanalyze, unless an exception is approved by Ecology on a case-by-case basis. Only mixed waste meeting the definition of "new batch", or granted an exception as discussed above, are authorized for transfer to the WTP Unit. Water additions for the purposes of waste transfer are not considered additions for the purposes of this Permit Condition.

III.10.C.3.e.iii Identify and include operating parameters to be monitored/controlled and limitations for these parameters for pre-process, in-process, and post-process operations addressing on a unit specific basis treatment effectiveness, as specified in Tables III.10.E.E through H, III.10.G.C, III.10.H.C, III.10.I.C, III.10.J.C, and III.10.K.C, waste compatibility, safe operation, and compatibility with unit materials of construction. Amend the sampling, analysis, and Quality Assurance/Quality Control (QA/QC) procedures to include these parameters and the monitoring frequency.

III.10.C.3.e.iv Requirements that the Permittees will, for Type I (primary) sumps if liquids are detected, and for Type II (secondary) sumps, as defined in Operating Unit Group 10, Addendum C, if liquid levels are outside normal operating parameters, either collect the liquid and return to the treatment process, or designate the sump contents for proper management and disposal prior to removal.

III.10.C.3.e.v For ILAW containers and IHLW canisters, a description of the procedures used for removal of mixed dangerous waste from exterior container surfaces, including a description of how contamination removal will be measured.

III.10.C.3.e.vi Requirement that wastes generated at the WTP Unit meet the receiving authorized TSD facility waste acceptance criteria prior to a waste stream transfer.

III.10.C.3.e.vii The frequency with which analysis of each waste will be reviewed, or repeated, to ensure that the analysis is accurate and current, including requirements and criteria for reevaluation of the sampling and analysis frequency for all waste streams.

III.10.C.3.e.viii Documentation demonstrating methods for obtaining samples of wastes are representative as discussed in WAC 173-303-110(2).

III.10.C.3.e.ix Where applicable, the methods for meeting the additional waste analysis requirements for specific waste management methods, as specified in WAC 173-303-140(4), 173-303-395(1), 173-303-630 through 173-303-695.

III.10.C.3.e.x For waste transferred from other permitted TSDs, the procedures for confirming that each dangerous waste received matches the identity of the waste specified on the accompanying waste profile documentation. This includes the procedure for identifying each waste movement at the Facility.

III.10.C.4 Recordkeeping

III.10.C.4.a The unit specific portion of the Hanford Facility Operating Record will include the documentation specified in Permit Attachment 6, Permit Condition II.I, (applicable to the WTP Unit), and other documentation specified in Operating Unit Group 10. Permit Attachment 6 provides a list of required records, and the methods of submittal for the facility and each unit group.

III.10.C.5 Procedure to Prevent Hazards

III.10.C.5.a The Permittees will design, construct, and operate the WTP Unit in compliance with Operating Unit Group 10, Addendum E, Section 6.1.

III.10.C.5.b The WTP Unit fire protection systems will be constructed to the applicable codes listed in Operating Unit Group 10, Addendum E, Section 6.3.1.4. Prior to the initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update Operating Unit Group 10, Addendum E, Sections 6.3, 6.4, and 6.5 to be consistent with design details, and resubmit for approval as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f, and Operating Unit Group 10, Appendix 1.0. In addition to the stand-by diesel generator for the LAW and HLW melters, updated Section 6.4.4. will include descriptions of the essential loads and critical systems supplied with back-up, un-interruptible, and standby power.

III.10.C.5.c The Permittees will inspect the WTP Unit to prevent malfunctions and deterioration, operator errors, and discharges that may cause or lead to the release of dangerous waste constituents to the environment, or a threat to human health. Inspections must be conducted in accordance with the WTP Unit Inspection Schedule, Operating Unit Group 10, Addendum E, Section 6.2, and Addendum E1. Prior to the receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update and resubmit to Ecology for review and approval Addendum E, Section 6.2 and the Inspection Schedule in Addendum E1 as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f, and Compliance Schedule in Operating Unit Group 10, Appendix 1.0. The revised schedule will include, but not be limited to the requirements in WAC 173-303-320(2) and III.10.C.5.c.i. through v. below.

III.10.C.5.c.i Detailed dangerous and/or mixed waste management unit specific and general inspection schedules and description of procedures pursuant to WAC 173-303-395(1)(d), 173-303-630(6), 173-303-640(4)(a)(i) and (6), 173-303-670(7)(b) in accordance with 173-303-680(3), and 173-303-695. The inspection schedule will be presented in the form of a table that includes a description of the inspection requirements, inspection frequency, and types of problems to look for during the inspections.

III.10.C.5.c.ii The proposed locations (scaled drawing with layout) and capabilities of camera(s) (i.e., zoom angles, field of view, etc.) to be used for remote inspections.

III.10.C.5.c.iii Schedule and program description for performing integrity assessments as specified in Permit Conditions III.10.E.9.e.i., III.10.G.10.e.i., III.10.H.5.e.i., III.10.I.1.a.v., III.10.J.5.e.i., and III.10.K.1.a.v.

III.10.C.5.c.iv Inspection schedules for leak detection system and control instrumentation to include, but not limited to, valves pressure devices, flow devices, measuring devices, as specified in Permit Conditions III.10.E.9.e.xi, III.10.F.3.c, and III.10.G.10.e.xii, and Permit Conditions III.10.H.5.f.xvi, and III.10.J.5.f.xvi.

III.10.C.5.c.v Inspection schedule will include inspections for all dangerous and/or mixed waste management units specified in Permit Sections III.10.D, E, F, G, H, I, J, and K.

III.10.C.5.d The Permittees will equip the WTP Unit with the equipment specified in Operating Unit Group 10, Addendum E, as required by Permit Condition II.B.1.

III.10.C.5.e The Permittees will test and maintain the equipment specified in Operating Unit Group 10, Addendums E and E1, as necessary, to assure proper operation in the event of emergency.

III.10.C.5.f The Permittees will maintain access to communications or alarms as provided in the *RPP-WTP Emergency Response Plan*, Operating Unit Group 10, Addendum F1 and Permit Condition II.B.2.

III.10.C.6 Contingency Plan

III.10.C.6.a The Permittees will immediately carry out applicable provisions of Permit Condition II.A.1 and the *RPP-WTP Emergency Response Plan*, Operating Unit Group 10, Addendum F1 whenever there is a release of dangerous and/or mixed waste or dangerous waste constituents, or other emergency circumstance, any of which threatens human health or the environment.

III.10.C.6.b Prior to the initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update the Contingency Plan and the *RPP-WTP Emergency Response Plan,* Operating Unit Group 10, Addendums F and F1, to be consistent with design details and WAC 173-303-350(3), incorporated by reference, and resubmit as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f, in compliance with WAC 173-303-350(5)(c), and Operating Unit Group 10, Appendix 1.0.

III.10.C.6.c After initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will review and amend, if necessary, the applicable portions of the Contingency Plan and the *RPP-WTP Emergency Response Plan*, Operating Unit Group 10, Addendums F and F1 in accordance with the provision of WAC 173-303-350(5). The Addendums F and F1 will be amended as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f.

III.10.C.6.d RESERVED

III.10.C.6.e RESERVED

III.10.C.7 Personnel Training

III.10.C.7.a Prior to the initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update and resubmit, to Ecology for review and approval, the Training

Program description in Operating Unit Group 10, Addendum G as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f. and Compliance Schedule in Operating Unit Group 10, Appendix 1.0. The revised Training Program description will include but not be limited to:

III.10.C.7.a.i Detailed unit specific and general Training Program descriptions) as required to demonstrate compliance with WAC 173-303-330 and to include:

III.10.C.7.a.i.A Job titles and descriptions for each dangerous waste management position (e.g. waste designator, waste operator, laboratory technician, etc.);

III.10.C.7.a.i.B Outline of the training program updated to discuss initial, refresher, and on-the-job training; correlated to each dangerous waste management position;

III.10.C.7.a.i.C Table G-1 in Operating Unit Group 10, Addendum G, updated to include the type and amount of introductory, refresher, and on-the-job training required for each dangerous waste management position [WAC 173-303-806(4)(a)(xii)].

III.10.C.7.a.ii Sufficient detail to document that the training and qualification program for all categories of personnel whose activities may reasonably be expected to directly affect emissions from the LAW and HLW Systems, except control room operators, is appropriately consistent with 40 CFR 63.1206(c)(6)(ii), and for control room operators, is appropriately consistent with 40 CFR 63.1206(c)(6)(i) and 63.1206(c)(6)(iii) through 63.1206(c)(6)(vi) [WAC 173-303-680(2)].

III.10.C.7.b The Permittees will ensure that the LAW and HLW Systems are operated and maintained, at all times, by persons who are trained and qualified to perform these and any other duties that may reasonably be expected to directly affect emissions from the LAW and HLW Systems [WAC 173-303-680(2)].

III.10.C.7.c The Permittees will conduct personnel training in accordance with the approved description of the WTP Dangerous Waste Training Plan, Operating Unit Group 10, Addendum G, pursuant to WAC 173-303-330. The Permittees will maintain documents in accordance with Permit Condition II.C.1 and WAC 173-303-330(2) and (3).

III.10.C.7.d RESERVED.

III.10.C.7.e The Permittees will submit, under separate cover, the actual detailed WTP Dangerous Waste Training Plan in accordance with the Compliance Schedule in Operating Unit Group 10, Appendix 1.0. The WTP Dangerous Waste Training Plan will be reviewed for compliance with the outline of the training program in Operating Unit Group 10, Addendum G and requirements of WAC 173-303-330. The Training Plan will be incorporated into the Administrative Record.

III.10.C.8 Closure

III.10.C.8.a The Permittees must conduct closure of the WTP Unit according to the Closure Plan in Operating Unit Group 10, Addendum H, and Permit Condition III.10.C.8. The closure plan will be modified according to provisions of Permit Condition I.C.3.

III.10.C.8.b Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update and resubmit the Closure Plan, Operating Unit Group 10, Addendum H for approval as a permit modification pursuant to Permit Condition III.10.C.2.g., to be consistent with design details and schedule described in Operating Unit Group 10, Appendix 1.0. The updated Closure Plan must be consistent with the closure performance standards specified in WAC 173-303-610(2)(a)-(b), WAC 173-340 and, in addition for Containment Buildings, consistent with 40 CFR 264.1102(b) as referenced by WAC 173-303-695.

III.10.C.8.c The Permittees will submit, for Ecology review and approval, an update to the Closure Plan, Operating Unit Group 10, Addendum H, including all documentation required by Permit Condition II.D, within one hundred eighty (180) days prior to commencing partial closure, as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f.

III.10.C.8.d One hundred eighty (180) days prior to commencing final closure of Operating Unit Group 10, the Permittees must submit to Ecology, for review and approval, a revised Closure Plan, including all documentation required by Permit Condition II.D, as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f.

III.10.C.8.e RESERVED

III.10.C.8.f To achieve clean closure, the Permittees will remove dangerous waste, dangerous waste constituents, and dangerous waste residues throughout the closing unit and throughout any areas affected by releases from the closing unit to concentrations that do not exceed numeric cleanup levels determined using residential exposure assumptions according to the Model Toxics Control Act (MTCA) Regulations, Chapter 173-340 WAC and all structures, equipment, bases, liners, and other materials containing or contaminated with dangerous waste, constituents, or residues have met specific waste removal and decontamination standards approved by Ecology, in accordance with WAC 173-303-610(2)(b)(i)-(ii).

III.10.C.8.g RESERVED.

III.10.C.8.h Documentation supporting the independent registered professional engineer's certification of closure must be submitted to Ecology with the closure certification required by WAC 173-303-610(6). In addition to the items in Operating Unit Group 10, Addendum H, the documentation must include the following and other information Ecology may request.

III.10.C.8.h.i Sampling procedures that were followed;

III.10.C.8.h.ii Soil and concrete locations that were sampled;

III.10.C.8.h.iii Sample labeling and handling procedures that were followed, including chain of custody procedures;

III.10.C.8.h.iv Description of procedures that were followed to decontaminate concrete or metal to meet the clean closure standards approved by Ecology, in accordance with the closure performance standards of WAC 173-303-610(2)(a)(ii) and in a manner that minimizes or eliminates post-closure escape of dangerous waste constituents, or to achieve a "clean debris surface" as specified in 40 CFR 268.45, Table 1, concrete surfaces, as incorporated by reference in WAC 173-303-140. [WAC 173-303-610(2)(b)(ii)].

III.10.C.8.h.v Laboratory and field data, including supporting QA/QC summary;

III.10.C.8.h.vi Report that summarizes closure activities;

III.10.C.8.h.vii Copy of all field notes taken by the independent registered professional engineer; and

III.10.C.8.h.viii Copy of all contamination survey results.

III.10.C.9 **Critical Systems**

III.10.C.9.a The WTP Unit critical systems, as defined in the definition section of Operating Unit 10 and are identified in Operating Unit Group 10, Appendix 2.0.

III.10.C.9.b As the design proceeds, Ecology will modify this Permit for reasons described in the WAC 173-303-830(3) to add additional systems to the Critical Systems in Operating Unit Group 10, Appendix 2.0.

III.10.C.9.c The Permittees will conduct all construction subject to this Permit in accordance with the approved designs, plans, and specifications that are required by this Permit, except as specified in Conditions III.10.C.9.d. or III.10.C.9.e. For purposes of Conditions III.10.C.9.d. and III.10.C.9.e., the Ecology representative will be an Ecology construction inspector, project manager, or other designated representative of Ecology.

III.10.C.9.d The Permittees will submit a nonconformance report (NCR) or construction deficiency report (CDR) to the Ecology representative (s), as applicable, within seven (7) calendar days of the Permittees becoming aware of incorporation of minor nonconformance or construction deficiency from the approved designs, plans, and specifications into the construction of critical systems, as defined in the Hanford Site-wide Permit definition section. Such minor nonconformance or construction deficiency will be defined, for the purposes of this Permit Condition, as nonconformance or construction deficiency that is necessary to accommodate proper construction and the substitution or the use of equivalent or superior materials or equipment that do not substantially alter the Permit conditions or reduce the capacity of the facility to protect human health or the environment. Such minor nonconformance or construction deficiency will not be considered a modification of this Permit. If Ecology determines that the nonconformance or construction deficiency is not minor, it will notify the Permittees in writing that a permit modification is required for the deviation and whether prior approval is required from Ecology before work proceeds which affect the nonconforming or construction deficiency item.

III.10.C.9.e The Permittees will formally document, with a nonconformance report (NCR) or construction deficiency report (CDR), as applicable, incorporation of minor nonconformance or construction deficiency from the approved designs, plans, and specifications into the construction of non-critical systems subject to this Permit. Such minor nonconformance or construction deficiency will not be considered a modification of this Permit. All NCR's and CDR's will be maintained in the WTP Unit Operating Record and will be made available to Ecology upon request or during the course of an inspection. If Ecology determines that the nonconformance or construction deficiency is not minor, it will notify the Permittees in writing that a permit modification is required for the deviation and whether prior approval is required from Ecology before work proceeds which affect the nonconforming or construction deficiency item.

III.10.C.9.f For each Critical System identified in Operating Unit Group 10, Appendix 2.0, the Permittees will submit to Ecology for review and approval, following the schedule in Operating Unit Group 10, Appendix 1.0, the information identified in Permit Conditions III.10.D.10., III.10.E.9., III.10.F.7., III.10.G.10., III.10.H.5., and III.10.J.5. Information Ecology determines to incorporate into the Permit will follow the Permit Condition III.10.C.2.g. process, unless stated otherwise within the specific permit condition.

Information Ecology determines necessary to support design basis will be incorporated into the Administrative Record.

III.10.C.9.g Upon completion of the WTP Unit construction subject to this Permit, the Permittees will produce as-built drawings of the project which incorporate the design and construction modifications resulting from all change documentation as well as modifications made pursuant to Permit Conditions III.10.C.2.e., III.10.C.2.f., and III.10.C.2.g. The Permittees will place the as-built drawings into the operating record within twelve (12) months of completing construction.

III.10.C.9.h The Permittees will formally document changes to approved designs, plans, and specifications with design change documentation [e.g., Design Change Notice (DCN), Field Change Request (FCR), Field Change Notice (FCN), Specification Change Notice (SCN), and Supplier Deviation Disposition Request (SDDR)]. All design change documentation will be maintained in the WTP Unit-specific Operating Record and will be made available to Ecology upon request or during the course of an inspection. For any design change documentation affecting any critical systems, the Permittees will provide copies to Ecology within seven (7) calendar days. Identification of critical systems will be included by the Permittees in each WTP Unit-specific dangerous waste permit application, closure plan, or permit modification, as appropriate. If Ecology determines that the design change is not minor, it will notify the Permittees in writing that a permit modification is required for the design change and whether prior approval is required from Ecology before work affected by the design change may proceed.

III.10.C.9.i Ventilation system duct work is not required to be doubly contained within the WTP Unit. However, upon discovery of accumulation of liquids within the duct work, a compliance plan will be submitted within sixty (60) days of discovery to correct the problem.

III.10.C.10 Equivalent Materials

III.10.C.10.a If certain equipment, materials, and administrative information (such as names, phone numbers, addresses, formatting) are specified in this Permit, the Permittees may use equivalent or superior substitutes. Use of such equivalent or superior items within the limits (e.g., ranges, tolerances, and alternatives) already clearly specified in sufficient detail in Operating Unit Group 10, are not considered a Permit modification. However, the Permittees must place documentation of the substitution, accompanied by a narrative explanation and the date the substitution became effective in the operating record within seven (7) days of putting the substitution into effect, and submit documentation of the substitution to Ecology, for approval. Upon review of the documentation of the substitution, if deemed necessary, Ecology may require the Permittees to submit a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f.

III.10.C.10.b If Ecology determines that a substitution was not equivalent to the original, they will notify the Permittees that the Permittees' claim of equivalency has been denied, of the reasons for the denial, and that the original material or equipment must be used. If the product substitution is denied, the Permittees will comply with the original approved product specification, find an acceptable substitution, or apply for a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f.

III.10.C.11 Risk Assessment

III.10.C.11.a The Permittees will submit a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., in accordance with Operating Unit Group 10, Appendix 1.0, to Ecology to incorporate revisions to the "Environmental Risk

Assessment Work Plan, Appendix 6.1. The revised document will be submitted for incorporation into Appendix 6.2 as the Final Risk Assessment Workplan. The Permittee will make revisions in consultation with Ecology to address the comments documented in Operating Unit Group 10, Appendix 6.1 and updated to address the following:

III.10.C.11.a.i EPA guidance for performance of Human Health and Ecological Risk Assessments for Hazardous Waste Combustion Facilities current at the time of the submittal, assuming both residential and non-residential use scenarios;

III.10.C.11.a.ii Toxicity data current at the time of the submittal;

III.10.C.11.a.iii Compounds newly identified or updated emissions data from current waste characterization and emission testing;

III.10.C.11.a.iv Air modeling updated to include stack gas parameters based on most current emissions testing and WTP Unit design;

III.10.C.11.a.v Physical/transport properties of constituents, current at the time of the submittal;

III.10.C.11.a.vi Process Description based on most current WTP Unit design;

III.10.C.11.a.vii Emissions data and all supporting calculations based on most current WTP Unit; and

III.10.C.11.a.viii Update of receptor locations based on land use or land use zoning changes, if any.

III.10.C.11.b Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit for Ecology review and approval as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., a Pre-Demonstration Test Risk Assessment Report as Appendix 6.3. The Pre-Demonstration Test Risk Assessment Report will address and include the following:

III.10.C.11.b.i Direct and indirect human health and ecological risk assessments performed pursuant to the Final Risk Assessment Work Plan in Permit Condition III.10.C.11.a.

III.10.C.11.b.ii Submittal of projected stack emissions data for Tables III.10.G.D., III.10.H.E., and III.10.J.E. and;

III.10.C.11.b.iii Submittal of the Basis and Assumptions (for incorporation into Appendix 6.3.1) for these emissions, including but not limited to, projected operating conditions, feed-rates, and treatment effectiveness, consistent with information provided and approved pursuant to Permit Conditions III.10.G.6., III.10.G.10., III.10.H.1., III.10.H.5., III.10.J.1., and III.10.J.5.

III.10.C.11.c Within ninety (90) days of Ecology approval of the Demonstration Report(s) submitted pursuant to Permit Condition III.10.H.3.d.i, the Permittees will submit a Final Risk Assessment Report as Operating Unit Group 10, Appendix 6.4, incorporating the emission test results from the Demonstration Report(s). The Final Risk Assessment Report will be prepared in accordance with the Final Risk Assessment Work Plan in Appendix 6.2, (as approved pursuant to Permit Condition III.10.C.11.a), except the following updates are hereby incorporated. The Permittees will also submit with this Final Risk Assessment Report, Permit Tables III.10.G.D. and III.10.I.E. and Operating Unit Group 10, Appendix 6.4.1 (Basis and Assumptions) updated to incorporate the emissions data from this Final Risk Assessment Report(s), as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f.

III.10.C.11.c.i Toxicity data current at the time of the submittal;

III.10.C.11.c.ii Compounds newly identified or updated emissions data from current waste characterization and emission testing;

III.10.C.11.c.iii Air modeling updated to include stack gas parameters based on most current emissions testing;

III.10.C.11.c.iv Physical/transport properties of constituents current at the time of the submittal;

III.10.C.11.c.v Update of receptor locations based on land use or land use zoning changes, if any;

III.10.C.11.c.vi Process description based on current WTP Unit design;

III.10.C.11.c.vii Emissions data and all supporting calculations based on current WTP Unit; and

III.10.C.11.c.viii Data from final risk assessment report pursuant to Permit Condition III.10.C.11.d, if available first, or simultaneously.

III.10.C.11.d Within ninety (90) days of Ecology approval of the Demonstration Report(s) submitted pursuant to Permit Condition III.10.J.3.d.i, the Permittees will submit a Final Risk Assessment Report as Operating Unit Group 10, Appendix 6.4, incorporating the emission test results from the Demonstration Report(s). The Final Risk Assessment Report will be prepared in accordance with the Final Risk Assessment Work Plan in Appendix 6.2, (as approved by Ecology pursuant to Permit Condition III.10.C.11.a), except the following updates are hereby incorporated. The Permittees will also submit with this Final Risk Assessment Report, Permit Tables III.10.G.D. and III.10.K.E. and Operating Unit Group 10, Appendix 6.4.1 (Basis and Assumptions) updated to incorporate the emissions data from this Final Risk Assessment Report, as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f.

III.10.C.11.d.i Toxicity data current at the time of the submittal;

III.10.C.11.d.ii Compounds newly identified or updated emissions data from current waste characterization and emission testing;

III.10.C.11.d.iii Air modeling updated to include stack gas parameters based on most current emissions testing;

III.10.C.11.d.iv Physical/transport properties of constituents current at the time of the submittal;

III.10.C.11.d.v Update of receptor locations based on land use or land use zoning changes, if any;

III.10.C.11.d.vi Process description based on current WTP Unit design;

III.10.C.11.d.vii Emissions data and all supporting calculations based on current WTP Unit; and

III.10.C.11.d.viii Data from final risk assessment report pursuant to Permit Condition III.10.C.11.c, if available first, or simultaneously.

III.10.C.11.e The Final Risk Assessment Report(s) required by Permit Conditions III.10.C.11.c. and III.10.C.11.d. may be combined, or provided separately, as appropriate.

III.10.C.12 RESERVED

III.10.C.13 Remote Data Access

Onsite, unrestricted, twenty-four (24) hour access to key WTP Unit operating data and emissions monitoring data will be provided to Ecology. This onsite, unrestricted access will include providing and maintaining for Ecology only use a computer terminal and printer with access to key WTP Unit operating data bases and emissions monitoring data bases. This terminal will be equipped with all necessary software and hardware to monitor, retrieve, and trend this data. Additional remote access will be provided on Ecology request if security concerns can be addressed.

III.10.C.14 Interim Period of Operation during Post Demonstration Test Period prior to receiving Ecology approval of the complete Demonstration Test Reports and the Final Risk Assessment Report.

III.10.C.14.a During this Interim Period of Operation, the Permittees are authorized to treat dangerous waste and mixed waste feed meeting the waste acceptance criteria of the Waste Analysis Plan in Addendum B, subject to the following conditions:

III.10.C.14.a.i Obtain receipt of Ecology's approval for the LAW Vitrification System according to Permit condition III.10.H.3.d.iii., prior to receiving dangerous or mixed waste feed into the LAW Vitrification System

III.10.C.14.a.ii Obtain receipt of Ecology's approval for the HLW Vitrification System according to Permit condition III.10.J.3.d.iii., prior to receiving dangerous or mixed waste feed into the HLW Vitrification System

III.10.C.14.a.iii Accept and treat up to 3 million gallons of Hanford tank waste feed in WTP.

III.10.C.15 Support Systems

III.10.C.15.a Mechanical Handling Systems

III.10.C.15.a.i The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., in accordance with the Compliance Schedule, as specified in Operating Unit Group 10, Appendix 1.0, engineering information as specified below, for incorporation into Appendices 9.6, 9.10, 10.6, and 10.10, or into the Administrative Record where noted.

A. System Descriptions for each Mechanical Handling system identified in Permit Table III.10.C.A, for incorporation into the Administrative Record (Compliance Schedule Item 36).

B. Mechanical Handling Diagrams and Mechanical Handling Data Sheets for the following pieces of equipment (Compliance Schedule Item 37):

   a. HDH-CRN-00005
   b. HEH-CRN-00003
   c. HPH-CRN-00001
   d. HPH-CRN-00002
   e. HSH-CRN-00001
   f. HSH-CRN-00014
   g. LEH-CRN-00003
   h. LPH-CRN-00002
   i. HEH-CRN-00001

C. Permit condition III.10.C.15.a. does not require:

   a. Additional submittals beyond those described in permit condition III.10.C.15.a.;
   b. IQRPE reports for equipment identified in III.10.C.15.a.i (B);

c. Installation inspections for equipment identified in III.10.C.15.a.i(B); and

d. Other inspection, verification, operability, maintenance, or records management beyond that which is specified elsewhere in this permit, for equipment identified in III.10.C.15.a.i (B), or by conditions III.10.C.15.a.ii and III.10.C.15.a.iii.

III.10.C.15.a.ii The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to initial receipt of dangerous waste and/or mixed waste in the WTP Unit, engineering information as identified below for incorporation into Appendices 9.13, 9.18, 10.13, and 10.18.

A. Equipment instrument logic narrative description related to safe operation of equipment covered by III.10.C.15.a.i(B), including but not limited to allowed travel path for bridge and trolley, upper and lower hook travel limits, two-blocking prevention, hook load limits, wire rope misreeling, and overspeed protection (Compliance Schedule Item 38).

B. Descriptions of operational procedures demonstrating appropriate controls and practices are in place to ensure equipment covered by III.10.C.15.a.i.(B) will be operated in a safe and reliable manner that will not result in damage to regulated tank systems, miscellaneous unit systems, or canisters of vitrified waste (Compliance Schedule Item 39).

III.10.C.15.a.iii Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following for incorporation into Addendum C: Updated Narrative Description and figures for all Mechanical Handling Systems identified in Permit Table III.10.C.A., to include but not limited to travel path, fail safe conditions, fail safe logic control, safety features and controls that minimize the potential for release of dangerous/mixed waste during normal operations, and lifting and/or load capabilities of each crane specified in III.10.C.15.a.i.(B).

Tables III.10.C.A – Mechanical Handling Systems		
Pretreatment Building		
	Pretreatment Filter Cave Handling System	PFH
	Pretreatment In-Cell Handling System	PIH
	Radioactive Solid Waste Handling System	RWH
Low-Activity Waste Building		
	Radioactive Solid Waste Handling System	RWH
	LAW Melter Equipment Support Handling System	LSH
	LAW Container Pour Handling System	LPH
	LAW Container Finishing Handling System	LFH
	LAW Melter Handling System	LMH
	LAW Canister Export Handling System	LEH
High-Level Waste Building		
	HLW Melter Cave Support Handling System	HSH
	HLW Canister Export Handling System	HEH
	HLW Filter Cave Handling System	HFH

	HLW Canister Pour Handling System	HPH
	HLW Canister Decontamination Handling System	HDH
	HLW Melter Handling System	HMH
	Radioactive Solid Waste Handling System	RWH

III.10.D CONTAINERS

III.10.D.1 Container Storage Areas and Storage Limits

III.10.D.1.a The Permittees may store dangerous and/or mixed waste meeting the waste acceptance criteria for containerized waste in the WAP, Operating Unit Group 10, Addendum B, (as approved pursuant to Permit Conditions III.10.C.3. and III.10.C.2), for storage in dangerous and/or mixed waste container storage units identified in Tables III.10.D.A through C.

III.10.D.1.b The Permittees may store containerized dangerous and mixed waste only in container storage areas listed in Permit Tables III.10.D.A (as approved/modified pursuant to Permit Condition III.10.D.10.), in accordance with Permit Section III.10.D, and in accordance with Operating Unit Group 10, Chapters 1.0 and 4.0, and Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 9.18, 10.4, 10.5, 10.7, 10.8, 10.9, 10.18, 12.4, 12.5, 12.7, 12.8, 12.9, and 12.15, as approved pursuant to Permit Conditions III.10.D.10.b. through d. The Permittees will limit the total volume of waste to quantities specified for the individual container storage areas listed in Permit Table III.10.D.A.

III.10.D.1.c The Permittees must maintain a free volume (i.e., free volume = total capacity of containment system minus volume occupied by equipment and containers within containment systems) within containment systems identified in Permit Tables III.10.D.B and III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.), equal to ten percent (10%) of the total volume of dangerous and mixed waste stored within the containment system, or the volume of the largest container stored within the containment system, whichever is greater.

III.10.D.1.d The Permittees will maintain documentation in the operating record for each container storage area listed in Permit Table III.10.D.A (as approved/modified pursuant to Permit Condition III.10.D.10.), in accordance with WAC 173-303-380.

III.10.D.1.e For the purpose of determining compliance with container storage area capacity limits and containment system requirements, every waste container will be considered to be full.

III.10.D.1.f RESERVED

III.10.D.2 Container Storage Areas Design and Construction

III.10.D.2.a The Permittees will construct container storage areas identified in Permit Tables III.10.D.A through III.10.D.C, as specified in all applicable drawings and specifications in Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9, as approved pursuant to Permit Condition III.10.D.10.b.

III.10.D.2.b RESERVED

III.10.D.2.c All container storage areas identified in Permit Tables III.10.D.A through III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.), must be constructed to protect containers from contact with accumulated liquids (e.g., leaks, spills, precipitation, fire water, liquids from damaged or broken pipes) [WAC 173-303-630(7)(a)(i) and WAC 173-303-630(7)(c)(ii)].

III.10.D.2.d Modifications to approved design, plans, and specifications for the container storage areas identified in Permit Tables III.10.D.A through III.10.D.C must be made in accordance with Permit Conditions III.10.C.2.e., f., and g, or III.10.C.9.d, e., and h.

III.10.D.3 Container Storage Area Installation

III.10.D.3.a RESERVED

III.10.D.3.b The Permittees will obtain and place in the WTP Unit operating record, within thirty (30) days of completion of each container storage area identified in Permit Tables III.10.D.A, through III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.), written statements by a qualified, installation inspector or a qualified registered, professional engineer, attesting that these areas were installed in compliance with WAC 173-303-630(7)(a), (b), and (c) [WAC 173-303-630(7), WAC 173-303-806(4)(b)(i)].

III.10.D.4 Container Management Practices

III.10.D.4.a RESERVED

III.10.D.4.b The Permittees will manage all waste in container storage areas identified in Permit Tables III.10.D.A through III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.), in accordance with procedures described in Operating Unit Group 10, Addendum C, Appendices 9.18, 10.18, and 12.15, as approved pursuant to Permit Condition III.10.D.10.c, and the following conditions:

III.10.D.4.b.i The operating records and waste tracking procedures will indicate all times at which containerized dangerous and mixed waste were removed from and returned to designated staging, storage, segregation, and treatment areas as approved pursuant to Permit Condition III.10.D.10.c.vi. (WAC 173-303-380).

III.10.D.4.b.ii The physical arrangement (i.e., spacing) of dangerous and mixed waste containers will be as specified in WAC 173-303-630(5)(c), except for the immobilized LAW containers and IHLW waste canisters, which must be as described in Operating Unit Group 10, Addendum C, Section 4.2.1.2.1., as updated pursuant to Permit Condition III.10.D.10.c.i.

III.10.D.4.b.iii All container storage areas must be operated to protect containers from contact with accumulated liquids resulting from leaks, spills, or precipitation [WAC 173-303-630(7)(a)(i) and (c)(ii)].

III.10.D.4.b.iv At all times, the Permittees will place and store ignitable and/or reactive dangerous and/or mixed waste in accordance with the procedures described in Operating Unit Group 10, Appendix 8.15, 9.18, 10.18, 11.15 and 12.15, as approved pursuant to Permit Condition III.10.D.10.c.xi.

III.10.D.4.b.v At all times, the Permittees will place and store incompatible dangerous and/or mixed waste in accordance with the procedures described in Operating Unit Group 10, Appendix 8.15, 9.18, 10.18, 11.15, and 12.15, as approved pursuant to Permit Condition III.10.D.10.c.xii.

III.10.D.4.b.vi At all times, storage containers holding dangerous and/or mixed waste that contain free liquids and/or exhibit either the characteristic of ignitability or reactivity as described in WAC 173-303-090(5) or (7), must be provided with a containment system in accordance with WAC 173-303-630(7)(a)(i) through (iii) [WAC 173-303-630(7)(c)].

III.10.D.4.b.vii At all times, containers holding dangerous and/or mixed waste in container storage areas must be closed, except when it is necessary to add or remove waste [WAC 173-303-630(5)(a)].

III.10.D.4.b.viii At all times, containers holding dangerous and/or mixed waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak [WAC 173-303-630(5)(b)].

III.10.D.4.b.ix A storage container holding a dangerous and/or mixed waste that is incompatible, as defined in WAC 173-303-040, with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other waste or materials or protected from them by means of a dike, berm, or wall. [WAC 173-303-630(9)(c)].

III.10.D.4.b.x If a container holding dangerous and/or mixed waste is not in good condition (e.g., exhibits severe rusting, apparent structural defects, or any other condition that could lead to container rupture or leakage) or is leaking, the Permittees will manage the container in accordance with procedures described in Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, 11.15, and 12.15, as approved pursuant to Permit Condition III.10.D.10.c.viii. [WAC 173-303-630(2)].

III.10.D.4.b.xi RESERVED

III.10.D.4.b.xii The Permittees will ensure that all containers used for dangerous and/or mixed waste management, are made of or lined with materials which will not react with and are otherwise compatible with the waste to be stored [WAC 173-303-630(4)].

III.10.D.4.b.xiii Except for lab packs assembled in compliance with WAC 173-303-161 requirements, the Permittees will not place incompatible wastes, or incompatible wastes and materials, in the same container, unless WAC 173-303-395(1)(b) is complied with [WAC 173-303-630(9)(a)].

III.10.D.4.b.xiv The Permittees will not place dangerous and/or mixed waste in an unwashed container that previously held an incompatible waste or material [WAC 173-303-630(9)(b)].

III.10.D.5 Identification of Containers and Container Storage Areas

III.10.D.5.a Pursuant to WAC 173-303-630(3), the Permittees will ensure that all dangerous and/or mixed waste containers (except as otherwise specified in Operating Unit Group 10, Addendum C, Section 4.2.1.3., as updated pursuant to Permit Condition III.10.D.10.c.i., for containers of ILAW and IHLW) are labeled in a manner that adequately identifies the major risk(s) associated with the contents. For purposes of container labeling, major risk(s) could include but are not limited to the following:

III.10.D.5.a.i PERSISTENT (if a WP01 or WP02 waste code);

III.10.D.5.a.ii TOXIC (if a WT01, WT02, or D waste code other than D001, D002, or D003);

III.10.D.5.a.iii IGNITABILITY (if a D001 and other waste codes);

III.10.D.5.a.iv CORROSIVE (if a D002 and other waste codes);

III.10.D.5.a.v REACTIVE (if a D003 and other waste codes).

III.10.D.5.b For all dangerous and mixed waste containers (except as otherwise specified in Operating Unit Group 10, Addendum C, Section 4.2.1.3., as updated pursuant to Permit Condition III.10.D.10.c.i., for containers of ILAW and canisters of IHLW), the Permittees will ensure that:

III.10.D.5.b.i Labels are not obscured or otherwise unreadable;

III.10.D.5.b.ii Waste containers are oriented so as to allow inspection of the labels identified in Permit Conditions III.10.D.5.a and III.10.D.5.b, the container tracking number, and, to the extent possible, any labels which the generator placed upon the container; and

III.10.D.5.b.iii Empty dangerous and mixed waste containers, as defined by WAC 173-303-160(2), must have their dangerous and/or mixed waste labels destroyed or otherwise removed immediately upon being rendered empty.

III.10.D.5.c The Permittees will post entrances and access points to all ILAW containers and IHLW canister storage areas, and any other areas where containers of ILAW and IHLW are handled, with signs that, in addition to meeting the requirements of WAC 173-303-310(2)(a), clearly identify the major risk(s) associated with the containers of ILAW and IHLW.

III.10.D.6 Containment Systems

Containerized dangerous and mixed waste, and other materials that are incompatible, will not be staged, segregated, or stored within the same containment system as identified in Permit Table III.10.D.C., as approved/modified pursuant to Permit Condition III.10.D.10. (e.g., metal pan, concrete berm, portable containment system) [WAC 173-303-630(9)(c)].

III.10.D.6.a The integrity of containment systems identified in Permit Table III.10.D.C. (as approved/modified pursuant to Permit Condition III.10.D.10.) must be maintained so that cracks, gaps, loss of integrity, deterioration, corrosion, or erosion of containment pads, joints in containment pads, berms, curbs, trenches, sumps, and coatings are repaired in accordance with Operating Unit Group 10, Addendum E, as approved/modified pursuant to Permit Conditions III.10.D.10.c.vii., III.10.C.5.b., and III.10.C.5.c. [WAC 173-303-320, WAC 173-303-630(7)(a)(i)].

III.10.D.6.b An impermeable coating, as specified in Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9 will be maintained for all concrete containment systems and will meet the following performance standards [WAC 173-303-630(7)(a)]:

III.10.D.6.b.i The coating must seal the containment system surface such that no cracks, seams, or other pathways through which liquid could migrate are present;

III.10.D.6.b.ii The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before waste could migrate from the containment system; and

III.10.D.6.b.iii The coating must be compatible with the waste managed in the containment system.

III.10.D.6.c The Permittees must inspect all containment systems specified in Permit Table III.10.D.C in accordance with the inspection schedules and requirements in Operating Unit Group 10, Addendum E, as approved/modified pursuant to Permit Conditions III.10.D.10.c.vii. and III.10.C.5.c, and take the following actions if liquid is detected in these containment systems:

III.10.D.6.c.i Remove the liquid from the containment system in accordance with procedures described in Operating Unit Group 10, Addendum E, (as modified pursuant to Permit Conditions III.10.C.5.b. and III.10.C.5.c.), Permit Condition III.10.C.6.a., and Operating Unit Group 10, Addendum F1 (as modified pursuant to Permit Condition III.10.C.6.b. and III.10.C.6.c.). The liquid removed from containment systems will be managed as dangerous and/or mixed waste, except for liquids from the Non-Radioactive Dangerous Waste Container Storage Area which will be managed as dangerous waste, unless the Permittees demonstrate through designation, (in accordance with WAC 173-303-070, incorporated by reference), that the liquid is no longer dangerous.

III.10.D.6.c.ii Determine the source of the liquid.

III.10.D.6.c.iii If the source of the liquid is determined to be a leak in a container, the Permittees must follow the procedures specified in Permit Condition III.10.D.4.b.x.

III.10.D.6.c.iv The Permittees must take action to ensure the incident that caused liquid to enter the containment system will not reoccur.

III.10.D.6.c.v The Permittees will document in the WTP Unit operating record actions/procedures taken to comply with i. through iv. above in accordance with WAC 173-303-630(6).

III.10.D.6.c.vi The Permittees will notify and report releases to the environment to Ecology in accordance with Permit Condition III.10.C.6.a.

III.10.D.7 Inspections

III.10.D.7.a The Permittees will inspect the container storage areas in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E of this Permit, as modified pursuant to Permit Condition III.10.C.5.c.

III.10.D.7.b The inspection data for the container storage areas will be recorded, and the records will be placed in the WTP Unit operating record in accordance with Permit Condition III.10.C.4.

III.10.D.8 Recordkeeping (WAC 173-303-380)

For the container storage areas, the Permittees will record and maintain in the WTP Unit operating record, all monitoring, recording, maintenance, calibration, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Condition III.10.C.4. and III.10.C.5.

III.10.D.9 Closure

The Permittees will close the container storage areas identified in Permit Tables III.10.D.A through III.10.D.C in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.D.10 Compliance Schedules

III.10.D.10.a All information identified for submittal to Ecology in III.10.D.10.b. through III.10.D.10.d. of this compliance schedule must be signed in accordance with requirements in WAC 173-303-810(12).

III.10.D.10.b The Permittees will submit to Ecology, consistent with the schedule described in Operating Unit Group 10, Appendix 1.0, for review and approval, prior to construction of container storage area and associated containment systems as identified in Permit Tables III.10.D.A and III.10.D.B respectively, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9 of this Permit. In order to incorporate engineering information specified below into Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9, Permit Condition III.10.C.2.g. process will be followed. At a minimum, container storage area and containment system drawings and specifications will show the following pursuant to WAC 173-303-806(4)(b):

III.10.D.10.b.i Design drawings (General Arrangement Drawings - in plan) and specifications including references to specific building codes (e.g., UBC, ASCE) for each container storage areas' foundation and associated containment system. These items should show basic design parameters and dimensions, and location of the container storage areas and associated containment systems; how containment system design promotes positive drainage control (such as a locked drainage valve) to prevent release of contaminated liquids and so that uncontaminated liquids can be drained promptly for convenience of operation; capacity of the containment system relative to the volume of the largest container to be stored; how the base underlying the containers is sloped (i.e., floor slopes to sumps) or the containment system is otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or other liquids, or how containers are kept from contact with standing liquids in the containment system (i.e., elevated or are otherwise protected); for container storage areas without associated containment systems, a description of how the storage area is designed or operated to drain and remove liquids or how containers are kept from contact with standing liquids;

III.10.D.10.b.ii Containment systems materials selection documentation (including, but not limited to, materials of construction, coatings and liner materials for concrete portions of containment systems);

III.10.D.10.b.iii Sketches, drawings, or data demonstrating compliance with WAC 173-303-630(8) (location of buffer zone and containers holding ignitable or reactive waste) and WAC 173-303-630(9)(c) (location of incompatible waste), where applicable;

III.10.D.10.b.iv Submit Permit Table III.10.D.B. completed to provide for all containment systems, the information as specified in each column heading, consistent with information to be provided in III.10.D.10.b.i. through iii. above.

III.10.D.10.c Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update and submit to Ecology, consistent with the schedule described in Operating Unit Group 10, Appendix 1.0, for review and approval, the following, as specified below, for incorporation into Operating Unit Group 10, Addendum C, and Appendices 9.18, 10.18, and 12.15, except Permit Condition III.10.D.10.c.vii., which will be incorporated into Operating Unit Group 10, Addendum E. In order to incorporate the following information (specified below) into Operating Unit Group 10, Appendix 9.18, 10.18, and 12.15, Permit Condition III.10.C.2.g. will be followed. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.D.10.b., III.10.D.10.c., and III.10.D.10.d. as approved by Ecology, and will include at a minimum, the following information as required pursuant to WAC 173-303-630 and WAC 173-303-340:

III.10.D.10.c.i Operating Unit Group 10, Addendum C, Narrative Descriptions, updated;

III.10.D.10.c.ii Descriptions of procedures for addition and removal of waste from containers;

III.10.D.10.c.iii Descriptions of procedures for opening and closing of containers, including any inspections performed prior to opening;

III.10.D.10.c.iv Descriptions of procedures for handling and transport of containers within the WTP Unit;

III.10.D.10.c.v Description of the tracking system used to track containers throughout the WTP Unit pursuant to WAC 173-303-380. The tracking system, at a minimum, will do the following:

A. Track the location of containers within the WTP Unit;

B. Track which containers have been shipped off-facility and/or off-site, and to where they have been shipped;

C. For containers intended for transport off-site, include information in accordance with the requirements specified in WAC 173-303-190(3)(b);

D. Record the date container is placed in the container storage area;

E. Record the nature of the waste in any given container, including dangerous waste designation codes, any associated land disposal restriction treatment requirements, and the major risk(s) associated with the waste (as described in Permit Conditions III.10.D.5.a. and III.10.D.5.c.).

III.10.D.10.c.vi Descriptions of procedures for container spacing, stacking, and labeling pursuant to WAC 173-303-630(3), WAC 173-303-630(5)(c), WAC 173-303-340(3), WAC 173-303-630(6);

III.10.D.10.c.vii Descriptions of procedures for investigating container storage areas and investigating and repairing containment systems [WAC 173-303-320, WAC 173-303-630(6)];

III.10.D.10.c.viii Descriptions of procedures for responding to damaged (e.g., severe rusting, apparent structural defects) or leaking containers [WAC 173-303-630(2)];

III.10.D.10.c.ix Descriptions of operational procedures demonstrating how accumulated liquids can be analyzed and removed from containment systems to prevent overflow [WAC 173-303-806(4)(b)(i)(E)];

III.10.D.10.c.x For portable containment systems, vendor information, design drawings, or sketches showing the following information. These items will include as a minimum basic design parameters, dimensions, and materials of construction; how the design promotes positive drainage control (such as a locked drainage valve) to prevent release of contaminated liquids and so that uncontaminated liquids can be drained promptly for convenience of operation; how the base underlying the containers is sloped (i.e., floor slopes to sumps) or the containment system is otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or other liquids, or how containers are kept from contact with standing liquids in the containment system (i.e., elevated or are otherwise protected); and capacity of the containment system relative to the volume of the largest container to be stored;

III.10.D.10.c.xi Where ignitable and reactive waste are stored or otherwise managed in containers, a description of the procedures used to ensure compliance with WAC 173-303-630(8)(a) and (b);

III.10.D.10.c.xii Where incompatible waste are stored or otherwise managed in containers, a description of the procedures used to ensure compliance with WAC 173-303-630(9)(a) and (b), and 173-303-395(1)(b) and (c);

III.10.D.10.c.xiii Submit Permit Table III.10.D.C completed to provide for all portable containment systems, the information as specified in each column heading, consistent with information to be provided in III.10.D.10.c.i. through xii. above;

III.10.D.10.c.xiv Test procedures and results or other documentation or information to show that the waste do not contain free liquids, as applicable.

III.10.D.10.d Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, consistent with the schedule described in Operating Unit Group 10, Appendix 1.0, for review and approval, completed Permit Tables III.10.D.A, III.10.D.B, and III.10.D.C, for incorporation into Operating Unit Group 10, Addendum C, and Appendices 9.18, 10.18, and 12.15 of this Permit. In order to incorporate the information into Operating Unit Group 10, Addendum C, and Appendices 9.18, 10.18, and 12.15 of this Permit, Permit Condition III.10.C.2.g. process will be followed.

Table III.10.D.A –Container Storage/Containment Building Areas Description

Dangerous and Mixed Waste Container Storage Areas	Maximum Capacity Gallons (Solids)(ft^3)[d]	Maximum Operating Volume (Liquid[c])
HLW Vitrification Plant		
IHLW Canister Storage Cave[a] (Room H-0132)	163,599 gal. (21,870 ft^3)	NA
HLW East Corridor El. 0' (Rooms HC-0108/09/10)	183,721 gal. (24,560 ft^3)	NA
HLW Loading Area (Room H-0130)	142,204 gal. (19,010 ft^3)	NA
Other Areas		
Non-Radioactive Dangerous Waste Container Storage Area[b]	56,104 gal. (7,500 ft^3)	RESERVED
Failed Melter Storage Facility (Building 32)[f]	403,947 gal. (54,000 ft^3)	RESERVED
Lab Waste Management Area (Rooms A-0139, A-0139A/B/C/D)	139,586 gal. (18,660 ft^3)	RESERVED
Containment Buildings/Container Storage	**Maximum Capacity Gallons (Solids)(ft^3)[d]**	**Maximum Operating Volume (Liquid[c])**
Pretreatment Plant	RESERVED	RESERVED
P-0123 Pretreatment Hot Cell Containment Building	RESERVED	RESERVED
Pretreatment Maintenance Containment Building	RESERVED	RESERVED
PM0124 Hot Cell Crane Maintenance Area	RESERVED	RESERVED
P-0121A Spent Resin Dewatering	RESERVED	RESERVED
P-0421A General Filter Room	RESERVED	RESERVED
P-0122A Waste Packaging Area	RESERVED	RESERVED
P-0123A Remote Decontamination Maintenance Cave	RESERVED	RESERVED
P-0124 C3 Workshop	RESERVED	RESERVED
P-0124A C3 Workshop	RESERVED	RESERVED
P-0125 Filter Cask Airlock	RESERVED	RESERVED
P-0125A Filter Cask Area	RESERVED	RESERVED
P-0128A MSM Repair Area	RESERVED	RESERVED
P-0128 Temporary Storage Room	RESERVED	RESERVED
P-0223 Pretreatment Filter Package Maintenance Containment Building		
P-0335 Pretreatment Filter Cave Room	RESERVED	RESERVED

P-0335A Decon Chamber	RESERVED	RESERVED
P-0431A General Filter Room	RESERVED	RESERVED
LAW Vitrification Plant		
L-0112 LAW LSM Gallery Containment Building	RESERVED	RESERVED
ILAW Container Finishing Containment Building	RESERVED	RESERVED
L-0109B Swabbing Area Line 2	RESERVED	RESERVED
L-0109C Decontamination Area Line 2	RESERVED	RESERVED
L-0109D Inert Fill Area Line 2	RESERVED	RESERVED
L-0115B Swabbing Area Line 1	RESERVED	RESERVED
L-0115C Decontamination Area Line 1	RESERVED	RESERVED
L-0115D Inert Fill Area Line 1	RESERVED	RESERVED
L-0109E Container Monitoring/Export Area	RESERVED	RESERVED
L-0115E Container Monitoring/Export Area	RESERVED	RESERVED
L-0119B LAW Consumable Import/Export Containment Building	RESERVED	RESERVED
L-0226A LAW C3 Workshop Containment Building	RESERVED	RESERVED
LAW Pour Cave Containment Building	RESERVED	RESERVED
L-B015A Melter 1 Pour Cave	RESERVED	RESERVED
L-B013C Melter 1 Pour Cave	RESERVED	RESERVED
L-B013B Melter 2 Pour Cave	RESERVED	RESERVED
L-B011C Melter 2 Pour Cave	RESERVED	RESERVED
L-B011B Future Melter 3 Pour Cave	RESERVED	RESERVED
L-B009B Future Melter 3 Pour Cave	RESERVED	RESERVED
ILAW Buffer Container Containment Building	RESERVED	RESERVED
L-B025C Container Buffer Store	RESERVED	RESERVED
L-B025D Container Rework	RESERVED	RESERVED
HLW Vitrification Plant		
HLW Melter Cave 1 Containment Building:	RESERVED	RESERVED
H-0117 Melter Cave 1		
H-0116B Melter Cave 1 C3/C5 Airlock		
H-0310A Melter Cave 1 Equipment Decon Pit		
HLW Melter Cave 2 Containment Building:	RESERVED	RESERVED
H-0106 Melter Cave 2		
H-0105B Melter Cave 2 C3/C5 Airlock		
H-0304A Melter Cave 2 Equipment Decon Pit		
H-0136 IHLW Canister Handling Cave Containment Building	RESERVED	RESERVED
H-0133 IHLW Canister Swab and Monitoring Cave Containment Building	RESERVED	RESERVED
HLW C3 Workshop Containment Building:	RESERVED	RESERVED
H-0311A C3 Workshop		

H-0311B C3 MSM Maintenance Workshop		
H-0104 HLW Filter Cave Containment Building	RESERVED	RESERVED
H-B032 HLW Pour Tunnel 1 Containment Building	RESERVED	RESERVED
H-B005A HLW Pour Tunnel 2 Containment Building	RESERVED	RESERVED
HLW Waste Handling Area Containment Building:	RESERVED	RESERVED
H-0410B E&I Room		
H0411 Waste Handling Room		
HLW Drum Swabbing and Monitoring Area Containment Building:	RESERVED	RESERVED
H-0126A Crane Maintenance Room		
H-0126B Swabbing and Monitoring Area		
H-B028 Cask Transfer Tunnel		

[a]Capacity is for immobilized glass waste storage.

[b]Capacity is for dangerous and/or mixed waste storage.

[c]All material within the containment systems will be considered waste for the purposes of calculating free volume, where free volume is the amount of space available in containment systems (i.e., free volume = total capacity of containment systems [which includes total capacity of portable containment systems] minus volume occupied by equipment and containers within containment systems).

[d]Gallons converted to cubic feet using a conversion factor of 1 gallon (liquid) x 0.134 = 1 ft^3 (rounded to the nearest whole number).

[e]Location and capacities of containers stored within portable containment systems specified on Table III.10.D.C are limited to the dangerous and mixed waste container storage areas and capacities specified above.

[f]The dimension for height (H) is based on the height of the largest waste container stored in the area (i.e., LAW container is 7.5 ft., HLW canister is 15 ft., melters are assumed to be 16 ft., and a B-25 box is 5 ft. – stacked a maximum of two high is 10ft).

Table III.10.D.B – Container Storage Area Containment Systems

Container Storage Areas	Permanent Containment System Description – Drawing #s	Permanent Containment System Sump/Floor Drain ID#	Permanent Containment System Dimensions[a] (ft) & Materials of Construction	Permanent Containment System Capacity (gal) (relative to 10% of the volume of all containers within the container storage area, or 100% of the volume of the largest container, whichever is greater).
Failed Melter Storage Facility (Building 32)	24590-BOF-P1-32-00001, Rev. 2	N/A	45' x 75" x 16'[b]	403,947 gal. (54,000 ft^3)

[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

[b]The dimension for height (H) is based on the height of the largest waste container stored in the area (i.e., LAW container is 7.5 ft., HLW canister is 15 ft., melters are assumed to be 16 ft., and a B-25 box is 5 ft. – stacked a maximum of two high is 10 ft).

1 **Table III.10.D.C – Container Storage Area Portable Containment Systems[a]**

Portable Containment System Description – Specifications and Vendor Information	Portable Containment System Container Storage Area(s) Location(s)	Portable Containment System Dimensions[b] (ft) & Materials of Construction	Portable Containment System Capacity (gal) (relative to 10% of the volume of all containers managed within the portable containment system, or 100% of the volume of the largest container, whichever is greater).
RESERVED	RESERVED	RESERVED	RESERVED
[a] Location and capacities of containers stored within portable containment systems specified on this Permit Table are limited to the dangerous and mixed waste container storage areas and capacities specified in Permit Table III.10.D.A. [b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).			

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III.10.E TANK SYSTEMS

III.10.E.1 Approved Waste and Storage Limits

III.10.E.1.a The Permittees may store in tank systems all dangerous and/or mixed waste listed in the Part A Forms, Operating Unit Group 10, Addendum A of this Permit and in accordance with the Waste Analysis Plan, Operating Unit Group 10, Addendum B as approved pursuant to Permit Condition III.10.C.3. of this Permit. Total tank system dangerous and/or mixed waste storage at the Facility will not exceed the volume(s) specified in the Part A Form 3 Permit Application, Addendum A of this permit.

III.10.E.1.b The Permittees may store and manage dangerous and/or mixed waste only in approved tank systems listed in Permit Tables III.10.E.A through D, I, K, M, and O, as approved/modified pursuant to Permit Condition III.10.E.9., in accordance with Permit Section III.10.E of this Permit, and in accordance with Operating Unit Group 10, Adendums1.0 and 4.0, and Operating Unit Group 10, Appendices 8.1 through 8.15, 9.1 through 9.14, 9.18, 10.1 through 10.14, 10.18, and 11.1 through 11.15 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.b through e. The Permittees will limit the total volume of waste to quantities specified for the individual units listed in Permit Tables III.10.E.A through D, I, K, M, and O.

III.10.E.1.c The Permittees will manage ignitable and reactive, and incompatible waste in accordance with WAC 173-303-395(1). Any tank system specified in Permit Tables III.10.E.A through D and III.10.E, I, K, M, and O as approved/modified pursuant to Permit Condition III.10.E.9., in which ignitable, reactive, or incompatible waste are managed will meet the requirements specified in WAC 173-303-640(9) and (10).

III.10.E.1.d The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer; independent corrosion expert; independent, qualified installation inspector; etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10 of this Permit:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new tank system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following tank system components (e.g., the tank, venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)).

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

III.10.E.1.e In all future permit submittals, the Permittees will include tank names with the tank designation (e.g., Process Condensate Vessels located in the RLD System are designated V45028A and V45028B, respectively).

III.10.E.2 Tank System Design and Construction

III.10.E.2.a The Permittees will construct the tank systems identified in Permit Tables III.10.E.A through D, I, K, M, and O, as approved/modified pursuant to Permit Condition III.10.E.9., as specified in Operating Unit Group 10, Appendices 8.1 through 8.14, 9.1

through 9.14, 10.1 through 10.14, and 11.1 through 11.14 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.b., III.10.E.9.c., and III.10.E.9.d.

III.10.E.2.b The Permittees will construct all secondary containment systems identified in Permit Tables III.10.E.A through D, and I through P, as approved/modified pursuant to Permit Condition III.10.E.9., as specified in Operating Unit Group 10, Appendices 8.2, 8.4 through 8.15, 9.2, 9.4 through 9.14, 9.18, 10.2, 10.4 through 10.14, 10.18 and 11.2, 11.4 through 11.15, 11.15 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.b., III.10.E.9.c., and III.10.E.9.d.

III.10.E.2.c Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the WTP Unit Tank Systems will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d, e., and h.

III.10.E.2.d The Permittees will maintain construction access to the internal portions of installed tanks with pulse jet mixers until Ecology has provided written approval of the tank system designs for wear allowance pursuant to WAC 173-303-640(3)(a).

III.10.E.2.d.i The Permittees will not install the following tanks in the WTP Unit until Ecology has provided written approval of the tank system designs for wear allowance pursuant to WAC 173-303-640(3)(a):

- Plant Wash Vessel, PWD-VSL-00044.
- Acidic Waste Vessel, RLD-VSL-00007.
- Plant Wash and Drains Vessel, RLD-VSL-00008.
- HLW Feed Receipt Vessel, HLP-VSL-00022.
- HLW Lag Storage Vessels, HLP-VSL-00027A and HLP-VSL-00027B.
- HLW Feed Blend Vessel, HLP-VSL-00028.
- Ultrafiltration Feed Preparation Vessels, UFP-VSL-00001A and UFP-VSL-00001B.
- Ultrafiltration Feed Vessels, UFP-VSL-00002A and UFP-VSL-00002B.

III.10.E.2.d.ii Except where exempted in writing by Ecology on the basis that wear allowance provisions will not be affected, fabrication and assembly of the following tanks and their internal components will be suspended until Ecology has provided written approval of the tank system designs for wear allowance pursuant to WAC 173-303-640(3)(a).

- HLW Feed Receipt Vessel, HLP-VSL-00022.
- HLW Lag Storage Vessels, HLP-VSL-00027A and HLP-VSL-00027B.
- HLW Feed Blend Vessel, HLP-VSL-00028.
- Ultrafiltration Feed Vessels, UFP-VSL-00002A and UFP-VSL-00002B.

III.10.E.3 Tank System Installation and Certification

III.10.E.3.a The Permittees must ensure that proper handling procedures are adhered to in order to prevent damage to the system during installation. Prior to covering, enclosing, or placing a new tank system or component in use, an independent, qualified, installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of tank systems or components, must inspect the system for the presence of any of the following items:

III.10.E.3.a.i Weld breaks;

III.10.E.3.a.ii Punctures;

III.10.E.3.a.iii Scrapes of protective coatings;

III.10.E.3.a.iv Cracks;

III.10.E.3.a.v Corrosion;

III.10.E.3.a.vi Other structural damage or inadequate construction/installation.

All discrepancies must be remedied before the tank system is covered, enclosed, or placed in use [WAC 173-303-640(3)(c)].

III.10.E.3.b For tank systems or components that are placed underground and that are back-filled, the Permittees must provide a backfill material that is a non-corrosive, porous, homogeneous substance. The backfill must be installed so that it is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported [WAC 173-303-640(3)(d)].

III.10.E.3.c The Permittees must test for tightness all new tanks and ancillary equipment prior to these components being covered, enclosed, or placed into use. If a tank system is found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the tank system being covered, enclosed, or placed in use [WAC 173-303-640(3)(e)].

III.10.E.3.d The Permittees must ensure ancillary equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction [WAC 173-303-640(3)(f)].

III.10.E.3.e The Permittees must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided in Operating Unit Group 10, Appendices 8.9, 8.11, 9.9, 9.11, 10.9, 10.11, 11.9, and 11.11 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.b.i., III.10.E.9.b.iv., III.10.E.9.b.v., III.10.E.9.c.i., III.10.E.9.c.iv., III.10.E.9.c.v., III.10.E.9.d.i., III.10.E.9.d.iv., and III.10.E.9.d.v. or other corrosion protection if the Ecology believes other corrosion protection is necessary to ensure the integrity of the tank system during use of the tank system. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation [WAC 173-303-640(3)(g)].

III.10.E.3.f Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will obtain, and keep on file in the WTP Unit operating record, written statements by those persons required to certify the design of the tank system and supervise the installation of the tank system in accordance with the requirements of WAC 173-303-640(3)(b), (c), (d), (e), (f), and (g), attesting that each tank system and corresponding containment system listed in Permit Tables III.10.E.A through D and III.10.E.I through P, as approved/modified pursuant to Permit Condition III.10.E.9., were properly designed and installed, and that repairs, pursuant to WAC 173-303-640(3)(c) and (e) were performed [WAC 173-303-640(3)(a) WAC 173-303-640(3)(h)].

III.10.E.3.g The independent tank system installation inspection and subsequent written statements will be certified pursuant to Permit Condition III.10.E.1.d., comply with all requirements of WAC 173-303-640(3)(h) and will consider, but not be limited to, the following tank system installation documentation:

III.10.E.3.g.i Field installation report with date of installation;

III.10.E.3.g.ii Approved welding procedures;

III.10.E.3.g.iii Welder qualifications and certification;

III.10.E.3.g.iv Hydro-test reports, as applicable, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Division 1, American Petroleum Institute (API) Standard 620, or Standard 650 as applicable;

III.10.E.3.g.v Tester credentials;

III.10.E.3.g.vi Field inspector credentials;

III.10.E.3.g.vii Field inspector reports;

III.10.E.3.g.viii Field waiver reports; and

III.10.E.3.g.ix Non-compliance reports and corrective action (including field waiver reports) and repair reports.

III.10.E.4 Integrity Assessments

III.10.E.4.a The Permittees will ensure periodic integrity assessments are conducted on the WTP Unit Tank Systems listed in Permit Tables III.10.E.A through D, I, K, M, and O, as approved/modified pursuant to Permit Condition III.10.E.9., over the term of this Permit as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.E.9.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.E.4.b The Permittees will address problems detected during the tank integrity assessments specified in Permit Condition III.10.E.4.a. following the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.E.9.e.i. and III.10.C.5.c.

III.10.E.4.c The Permittees must immediately and safely remove from service any Tank System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Conditions III.10.E.5.i.i through iv., vi., and vii. The affected tank system or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.E.5.i.v. [WAC 173-303-640(7)(e) and (f), WAC 173-303-640(8)].

III.10.E.5 Tank Management Practices

III.10.E.5.a No dangerous and/or mixed waste will be managed in the WTP Unit Tank System unless the operating conditions, specified under Permit Condition III.10.E.5 are complied with.

III.10.E.5.b The Permittees will install and test all process and leak detection system monitoring/instrumentation, as specified in Permit Tables III.10.E.E through H, as approved/modified pursuant to Permit Condition III.10.E.9., in accordance with Operating Unit Group 10, Appendices 8.1, 8.2, 8.14, 9.1, 9.2, 9.14, 10.1, 10.2, 10.14, 11.1, 11.2, and 11.14 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.e.ix. and III.10.E.9.d.x.

III.10.E.5.c The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the WTP Unit Tank System if these substances could cause the tank system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a)].

III.10.E.5.d The Permittees will operate the WTP Unit Tank System to prevent spills and overflows using the description of controls and practices as required under WAC 173-303-640(5)(b) described in Permit Condition III.10.C.5., and Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e.iv. [WAC 173-303-640(5)(b), WAC 173-303-806(4)(c)(ix)].

III.10.E.5.e For routinely non-accessible WTP Unit Tank Systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.E.9.e.vi., the Permittees will mark all routinely non-accessible tank system access points with labels or signs to identify the waste contained in the tanks. The label, or sign, must be legible at a distance of at least fifty (50) feet and must bear a legend that identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s). For the purposes of this Permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d)].

III.10.E.5.f For all tank systems not addressed in Permit Condition III.10.E.5.e., the Permittees will mark all these tank systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the tank. The labels, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend that identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s) [WAC 173-303-640(5)(d)].

III.10.E.5.g The Permittees will ensure that the secondary containment systems for the WTP Unit Tank Systems listed in Permit Tables III.10.E.A through D, I, K, M, and O, as approved/modified pursuant to Permit Condition III.10.E.9., are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, ground water, or surface water at any time that waste is in the tank system. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e.v [WAC 173-303-320, WAC 173-303-640(4)(b)(i), WAC 173-303-640(4)(e)(i)(C), WAC 173-303-640(6), and WAC 173-303-806(4)(c)(vii)].

III.10.E.5.h An impermeable coating, as specified in Operating Unit Group 10, Appendices 8.4, 8.5, 8.7, 8.9, 8.11, 8.12, 9.4, 9.5, 9.7, 9.9, 9.11, 9.12, 10.4, 10.5, 10.7, 10.9, 10.11, 10.12, 11.4, 11.5, 11.7, 11.9, 11.11, and 11.12 of this Permit, as approved pursuant to Permit Condition III.10.E.9.b.v., will be maintained for all concrete containment systems and concrete portions of containment systems for each WTP Unit Tank System listed in Permit Tables III.10.E.A through D and I through P, as approved/modified pursuant to Permit Condition III.10.E.9. Concrete containment systems that do not have a liner and have construction joints, must meet the requirements of WAC 173-303-640(4)(e)(ii)(C) and -806(4)(c)(vii). The coating will prevent migration of any dangerous and/or mixed waste into the concrete. All coatings will meet the following performance standards:

III.10.E.5.h.i The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present;

III.10.E.5.h.ii The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and/or mixed waste could migrate from the system; and

III.10.E.5.h.iii The coating must be compatible with the dangerous and/or mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), WAC 173-303-806(4)(c)(vii)].

III.10.E.5.i The Permittees will inspect all secondary containment systems for WTP Unit Tank Systems listed in Permit Tables III.10.E.A through D and I through P, as approved/modified pursuant to Permit Condition III.10.E.9., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.e.v. and III.10.C.5., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-320, WAC 173-303-640(5)(c), WAC 173-303-640(6), WAC 173-303-640(7), WAC 173-303-806(4)(a)(v)]:

III.10.E.5.i.i Immediately and safely stop the flow of dangerous and/or mixed waste into the tank system or secondary containment system, in accordance with procedures based on all applicable safety analysis documentation;

III.10.E.5.i.ii Determine the source of the dangerous and/or mixed waste;

III.10.E.5.i.iii Remove the waste from the secondary containment area pursuant to WAC 173-303-640(7)(b). The waste removed from containment areas of WTP Unit Tank Systems will be managed as dangerous and/or mixed waste;

III.10.E.5.i.iv If the cause of the release was a spill that has not damaged the integrity of the tank system, the Permittees may return the tank system to service pursuant to WAC 173-303-640(7)(e)(ii). In such a case, the Permittees will take action to ensure the incident that caused liquid to enter the containment systems of these tank systems will not reoccur [WAC 173-303-320(3);

III.10.E.5.i.v If the source of the dangerous waste and/or mixed waste is determined to be a leak from a primary WTP Unit Tank System, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees must comply with the requirements of WAC 173-303-640(7) and take the following actions [WAC 173-303-640(5)(c)]:

A. Close the tank system according to procedures in WAC 173-303-640(7)(e)(i), and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.; or

B. Repair and re-certify (in accordance with WAC 173-303-810(13)(a) as modified pursuant to Permit Condition III.10.E.1.d.) the tank system in accordance with Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e.v. before the tank system is placed back into service [WAC 173-303-640(7)(e) and (f), and WAC 173-303-806(4)(c)(vii)];

III.10.E.5.i.vi The Permittees will document in the operating record actions/procedures taken to comply with III.10.E.5.i.i. through v. above in accordance with WAC 173-303-640(6)(d);

III.10.E.5.i.vii The Permittees will notify and report releases to the environment to Ecology in accordance with WAC 173-303-640(7)(d).

III.10.E.5.j If liquids (e.g., dangerous and/or mixed waste leaks and spills, precipitation, fire water liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv), WAC 173-303-640(7)(b)(ii), WAC 173-303-806(4)(c)(vii)]:

A. Reasons for delayed removal;

B. Measures implemented to ensure continued protection of human health and the environment;

C. Current actions being taken to remove liquids from secondary containment.

III.10.E.5.k The Permittees will operate the WTP Unit Tank System in accordance with Operating Unit Group 10, Addendum C as updated pursuant to Permit Condition III.10.E.9.e.vi. and Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e., and the following:

III.10.E.5.k.i The Permittees will operate the WTP Unit Tank System in order to maintain the systems and process parameters listed in Permit Tables III.10.E.E through H, as approved/modified pursuant to Permit Condition III.10.E.9., within the operating trips and operating ranges specified in Permit Tables III.10.E.E through H, and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix, 6.3.1. as approved pursuant to Permit Condition III.10.C.11.b. [WAC 173-303-815(2)(b)(ii) and WAC 173-303-640(5)(b)]. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Conditions III.10.C.11.c. or III.10.C.11.d.;

III.10.E.5.k.ii The Permittees will calibrate/function test the instruments listed on Permit Tables III.10.E.E through H in accordance with Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e.xi.

III.10.E.5.l Tank systems that have the potential for formation and accumulation of hydrogen gases must be operated to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.E.5.m For each tank system holding dangerous waste which are acutely or chronically toxic by inhalation, operate the system to prevent escape of vapors, fumes or other emissions into the air [WAC 173-303-640(5)(e), WAC 173-303-806(4)(c)(xii)].

III.10.E.6 Inspections [WAC 173-303-640(6)]

III.10.E.6.a The Permittees will inspect the WTP Unit Tank Systems in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified pursuant to Permit Condition III.10.C.5.c.

III.10.E.6.b The inspection data for the WTP Unit Tank Systems will be recorded, and the records will be placed in the WTP Unit operating record, in accordance with Permit Condition III.10.C.4.

III.10.E.7 Recordkeeping (WAC 173-303-380)

For the WTP Unit Tank Systems, the Permittees will record and maintain in the WTP Unit operating record, all monitoring, calibration, recording, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4. and III.10.C.5.

III.10.E.8 Closure

The Permittees will close the WTP Unit Tank Systems in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.E.9 Compliance Schedule

III.10.E.9.a All information identified for submittal to Ecology in b. through e. of this compliance schedule must be signed and certified in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.E.1.d. [WAC 173-303-806(4)].

III.10.E.9.b The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to construction of each secondary containment and leak detection system for the WTP Unit Tank System (per level, per WTP Unit building and outside the WTP Unit buildings) as identified in Permit Tables III.10.E.A through D, J, L, N, and P, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.4, 8.5, 8.7, 8.8, 8.9, 8.11, 8.12, 9.4, 9.5, 9.7, 9.8, 9.9, 9.11, 9.12, 10.4, 10.5, 10.7, 10.8, 10.9, 10.11, 11.4, 11.5, 11.7, 11.8, 11.9, and 11.11 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):

III.10.E.9.b.i IQRPE Reports (specific to foundation, secondary containment, and leak detection system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendices 8.0 through 11.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. IQRPE Reports will be consistent with the information separately provided in Permit Conditions III.10.E.9.b.ii. through ix. below. The IQRPE Report(s) (specific to foundation, secondary containment and leak detection system) for the LAW and HLW buildings (-21 foot elevation only) will be submitted with the first IQRPE Report for tanks, identified in Permit Condition III.10.E.9.c.i. [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.b.ii Design drawings (General Arrangement Drawings in plan) and specifications for the foundation, secondary containment, including, liner installation details, and leak detection methodology [Note: leak detection systems for areas where daily, direct, or remote visual inspection is not feasible, will be continuous in accordance with WAC 173-303-640(4)(e)(iii)(C)]. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f), WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.b.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the secondary containment system. This information will demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [WAC 173-303-640(4)(c)(ii), WAC 173-303-806(4)(c)(vii)];

III.10.E.9.b.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil, including factors affecting the potential for corrosion as required under WAC 173-303-640(3)(a)(iii)(B) [WAC 173-303-806(4)(c)(v)];

III.10.E.9.b.v Secondary containment/foundation and leak detection system materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials as applicable) [WAC 173-303-806(4)(c)(i)];

III.10.E.9.b.vi Detailed description of how the secondary containment for each tank system will be installed in compliance with WAC 173-303-640(3)(c) [WAC 173-303-806(4)(c)(vi)];

III.10.E.9.b.vii Submit Permit Tables III.10.E.J, L, N, and P, completed to provide for all secondary containment sumps and floor drains, the information as specified in each column heading, consistent with information to be provided in Permit Conditions III.10.E.9.b.i. through vi. above;

III.10.E.9.b.viii Documentation that secondary containment and leak detection systems will not accumulate hydrogen gas levels above the lower explosive limit and in accordance with Appendix 7.15 for incorporation into the Administrative Record [WAC 173-303-340].

III.10.E.9.b.ix A detailed description of how tank system design provides access for conducting future tank integrity assessments [WAC 173-303-640(3)(b), WAC 173-303-806(4)(c)(vi)];

III.10.E.9.c The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of each tank as identified in Permit Tables III.10.E.A through D, and I, K, M, and O engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.1 through 8.9, 8.11 through 8.14, 9.1 through 9.9, 9.11 through 9.14, 10.1 through 10.9, 10.11 through 10.14, 11.1 through 11.9, and 11.11 through 11.14 of this Permit. Tanks will include primary sumps. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 (the information specified below will include dimensioned engineering drawings):

III.10.E.9.c.i IQRPE Reports (specific to tanks) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below.

Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendices 8.0 through 11.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information separately provided in Permit Conditions III.10.E.9.c.ii. through xii. below and the IQRPE Report specified in Permit Condition III.10.E.9.b.i. [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.c.ii Design drawings (General Arrangement Drawings in plan , Process Flow Diagrams, Piping and Instrumentation Diagrams [including pressure control systems], Mechanical Drawings) and specifications, and other information, specific to tanks (to show location and physical attributes of each tank) [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i) through (iv)];

III.10.E.9.c.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the tank(s). Structural support calculations specific to off-specification, non-standard, and field fabricated tanks will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.c.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with water, including factors affecting the potential for corrosion as required under WAC 173-303-640(3)(a)(iii)(B) [WAC 173-303-806(4)(c)(v)];

III.10.E.9.c.v Tank materials selection documentation (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.c.vi Tank vendor information (including, but not limited to required performance warranties, as available), consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record [WAC 173-303-640, and WAC 173-303-806(4)(c)];

III.10.E.9.c.vii System Descriptions related to tanks will be submitted for incorporation into the Administrative Record;

III.10.E.9.c.viii Mass balance for each projected operating condition, including assumptions and formulas used to complete the mass balance, so that they can be independently verified, and will be submitted for incorporation into the Administrative Record;

III.10.E.9.c.ix A detailed description of how the tanks will be installed in compliance with WAC 173-303-640(3)(c), (d), and (e) [WAC 173-303-806(4)(c)(vi)];

III.10.E.9.c.x Submit Permit Tables III.10.E.I, K, M, and O, completed to provide for all primary containment sumps and floor drains, the information as specified in each column heading, consistent with information to be provided in Permit Conditions III.10.E.9.c.i. through ix.;

III.10.E.9.c.xi Documentation that tanks are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-340];

III.10.E.9.c.xii Documentation that tanks are designed to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) Extremely Hazardous Waste limit and in accordance with Appendix 7.15 for incorporation into the Administrative Record [WAC 173-303-640(5)(e), WAC 173-303-806(4)(c)(xii)];

III.10.E.9.d The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of ancillary equipment for each tank system, as identified in Permit Tables III.10.E.A, through D, and I through P, not addressed in Permit Condition III.10.E.9.c., engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.1 through 8.9, 8.11 through 8.14, 9.1 through 9.9, 9.11 through 9.14, 10.1 through 10.9, 10.11 through 10.14, 11.1 through 11.9, and 11.11 through 11.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 (the information specified below will include dimensioned engineering drawings):

III.10.E.9.d.i IQRPE Reports (specific to ancillary equipment) will include a review of design drawings, calculations, and other information as applicable, on which the certification report is based. The reports will include, but not be limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 8.0 through 11.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information provided separately in Permit Conditions III.10.E.9.d.ii. through xiii. below and the IQRPE Reports specified in Permit Conditions III.10.E.9.b and III.10.E.9.c. [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.d.ii Design drawings (Process Flow Diagrams, Piping and Instrumentation Diagrams [including pressure control systems], etc.) specifications (including required performance warranties), and other information specific to ancillary equipment (these drawings should include all equipment such as pipe, valves, fittings, pumps, instruments, etc.) [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i), (iii), (iv)];

III.10.E.9.d.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the ancillary equipment [WAC 173-303-640(3)(a), WAC 173-303-640(3)(f), WAC 173-303-806(4)(c)(i)];

III.10.E.9.d.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil and water, including factors affecting the potential for corrosion as required under WAC 173-303-640(3)(a)(iii)(B) [WAC 173-303-806(4)(c)(v)];

III.10.E.9.d.v Materials selection documentation for ancillary equipment (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.d.vi Vendor information, consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record [WAC 173-303-640, and WAC 173-303-806(4)(c)];

III.10.E.9.d.vii Tank, ancillary equipment, and leak detection system instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.);

III.10.E.9.d.viii System Descriptions related to ancillary equipment and system descriptions related to leak detection systems, , for incorporation into the Administrative Record;

III.10.E.9.d.ix A detailed description of how the ancillary equipment will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), and WAC 173-303-806(4)(c)(vi)];

III.10.E.9.d.x For process monitoring, control, and leak detection system instrumentation for the WTP Unit Tank System as identified in Permit Tables III.10.E.E through H, a detailed description of how the process monitoring, control, and leak detection system instrumentation will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), WAC 173-303-806(4)(c)(vi)];

III.10.E.9.d.xi Mass balance for projected normal operating condition used in developing the process and instrumentation diagrams, including assumptions and formulas used to complete the mass balance, so that they can be independently verified, for incorporation into the Administrative Record;

III.10.E.9.d.xii Documentation that ancillary equipment is designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-340].

III.10.E.9.d.xiii Leak detection system documentation (e.g. vendor information, etc.) consistent with information submitted under Permit Condition III.10.E.9.c.ii. and Permit Conditions III.10.E.9.d.ii., vii., viii. and x. above, will be submitted for incorporation into the Administrative Record.

III.10.E.9.e Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following as specified below for incorporation into Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, 11.15 of this Permit, except Permit Condition III.10.E.9.e.v., which will be incorporated into Operating Unit Group 10, Addendum E of this Permit. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.E.9.b., c., d., and e., III.10.C.3.e., and III.10.C.11.b., as approved by Ecology.

III.10.E.9.e.i Integrity assessment program and schedule for all WTP Unit tanks will address the conducting of periodic integrity assessments on all WTP Unit tanks over the life of the tank, in accordance with III.10.E.9.b.ix. and WAC 173-303-640(3)(b), and descriptions of procedures for addressing problems detected during integrity assessments. The schedule must be based on past integrity assessments, age of the tank system, materials of construction, characteristics of the waste, and any other relevant factors [WAC 173-303-640(3)(b), WAC 173-303-806(4)(c)(vi)];

III.10.E.9.e.ii Detailed plans and descriptions, demonstrating the leak detection system is operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous and/or mixed waste, or accumulated liquid in the secondary containment system within twenty-four (24) hours [WAC 173-303-640(4)(c)(iii)]. Detection of a leak of at least 0.1 gallons per hour within twenty-four (24) hours is defined as being able to detect a leak within twenty-four (24) hours. Any exceptions to this criteria must be approved by Ecology [WAC 173-303-640(4)(c)(iii), WAC 173-303-806(4)(c)(vii)];

A. Dangerous waste pipe penetrations that require a penetration seal in accordance with the International Building Code (IBC) and DOE-STD-1066, DOE Standard for Fire Protection Design Criteria, or to meet ventilation sealing requirements identified in Table III.10E.Q, are not required to meet the 0.1 gallons per hour within twenty-four

(24) hours leak detection rate for those sections of piping that are in contact with approved silicone or equivalent low-permeability seal material.

B. Piping on either side of the penetration seal must meet the requirements of III.10.E.9.e.ii.

C. Revisions (including additions or deletions to Table III.10.E.Q will be submitted to Ecology for review and approval pursuant to Conditions III.10.C.2.e and III.10.C.2.f. Addition of penetration seal locations to Table III.10.E.Q. will be approved by Ecology prior to installation of the penetration seals.

Table III.10.E.Q Tank System Penetration Seal Locations

Facility	Room No	Orientation	Discipline	Penetration Sequence No
Reserved	Reserved	Reserved	Reserved	Reserved

III.10.E.9.e.iii Detailed operational plans and descriptions, demonstrating that spilled or leaked waste and accumulated liquids can be removed from the secondary containment system within twenty-four (24) hours [WAC 173-303-806(4)(c)(vii)];

III.10.E.9.e.iv Descriptions of operational procedures demonstrating appropriate controls and practices are in place to prevent spills and overflows from tanks or containment systems in compliance with WAC 173-303-640(5)(b)(i) through (iii) [WAC 173-303-640(5)(b), WAC 173-303-806(4)(c)(ix)];

III.10.E.9.e.v Description of procedures for investigation and repair of tank systems [WAC 173-303-320, WAC 173-303-640(6), WAC 173-303-640(7)(e) and (f), WAC 173-303-806(4)(a)(v), WAC 173-303-806(4)(c)(vii)];

III.10.E.9.e.vi Updated Addendum C, Narrative Descriptions, Tables and Figures as identified in Permit Tables III.10.E.A through D (as modified pursuant to Permit Condition III.10.E.9.e.xii.) and updated to identify routinely non-accessible tank systems;

III.10.E.9.e.vii Description of procedures for management of ignitable and reactive, and incompatible dangerous and/or mixed waste in accordance with WAC 173-303-640(9) and (10) [WAC 173-303-806(4)(c)(x)].

III.10.E.9.e.viii A description of the tracking system used to track dangerous and/or mixed waste throughout the WTP Unit Tank System, pursuant to WAC 173-303-380.

III.10.E.9.e.ix Permit Tables III.10.E.E through H will be completed for WTP Unit Tank System process and leak detection system monitors and instruments (to include but not limited to: instruments and monitors measuring and/or controlling flow, pressure, temperature, density, pH, level, humidity, and emission) to provide the information as specified in each column heading. Process and leak detection system monitors and instruments for critical systems as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b. and for operating parameters as required to comply with Permit Condition III.10.C.3.e.iii. will be addressed. Process monitors and instruments for non-waste management operations (e.g., utilities, raw chemical storage, non-contact cooling waters, etc.) are excluded from this permit condition.

III.10.E.9.e.x Supporting documentation for operating trips and expected operating range as specified in Permit Tables III.10.E.E through H as approved pursuant to Permit Condition III.10.E.9.e.ix.

III.10.E.9.e.xi Documentation of process and leak detection instruments and monitors (as listed in Permit Tables III.10.E.E through H) for the WTP Unit Tank Systems are to include but not be limited to the following:

A. Procurement specifications.

B. Location used.

C. Range, precision, and accuracy.

D. Detailed descriptions of calibration/functionality test procedures (e.g., method number [ASTM]) or provide a copy of manufacturer's recommended calibration procedures.

E. Calibration/functionality test, inspection, and routine maintenance schedules and checklists, including justification for calibration, inspection and maintenance frequencies, criteria for identifying instruments found to be significantly out of calibration, and corrective action to be taken for instruments found to be significantly out of calibration (e.g., increasing frequency of calibration, instrument replacement, etc.).

F. Equipment instrument control logic narrative description (e.g., descriptions of failsafe conditions, etc.), as identified in Permit Tables III.10.E.E through H not addressed in Permit Condition III.10.E.9.d.

III.10.E.9.e.xii Permit Tables III.10.E.A through D amended as follows:

A. Under column 1, update and complete list of dangerous and/or mixed waste tank systems, including plant items that comprise each system (listed by item number).

B. Under column 2, update and complete system designations.

C. Under column 3, replace the 'reserved' with the Operating Unit Group 10, Appendices 8.0, 9.0, 10.0, and 11.0, subsections specific to tank systems as listed in column 1.

D. Under column 4, update and complete list of narrative description tables and figures.

E. Under column 5, update and complete maximum capacity, for each tank.

III.10.E.9.e.xiii Permit Tables III.10.E.I, K, M, and O amended as follows:

A. Under column 1, replace the 'reserved' with the updated and complete list of sump numbers and room location.

B. Under column 2, replace the 'reserved' with the updated and complete maximum sump capacities in gallons.

C. Under column 3, replace the 'reserved' with the updated and complete sump dimensions and materials of construction.

D. Under column 4, replace the 'reserved' with the updated and complete list of engineering descriptions (drawing numbers, specifications, etc.).

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Waste Feed Receipt Process System FRP-VSL-00002A (Waste Feed Receipt Vessel) FRP-VSL-00002B (Waste Feed Receipt Vessel) FRP-VSL-00002C (Waste Feed Receipt Vessel) FRP-VSL-00002D (Waste Feed Receipt Vessel)	FRP	**24590-PTF** -M2-FRP-P0001, Rev 2 -M2-FRP-P0002, Rev 2 -M2-FRP-P0003, Rev 2 -M2-FRP-P0004, Rev 4 -M5-V17T-00003, Rev 2 -M6-FRP-00001001, Rev 0 -M6-FRP-00001002, Rev 0 -M6-FRP-00002001, Rev 0 -M6-FRP-00002002, Rev 0 -M6-FRP-00003001, Rev 0 -M6-FRP-00003002, Rev 0 -M6-FRP-00003003, Rev 0 -M6-FRP-00003004, Rev 0 -M6-FRP-00003005, Rev 0 -M6-FRP-00005001, Rev 0 -M6-FRP-00005002, Rev 0 -M6-FRP-00005003, Rev 0 -M6-FRP-00005004, Rev 0 -M6-FRP-00005005, Rev 0 -M6-FRP-00005006, Rev 0 -M6-FRP-00005007, Rev 0 -M6-FRP-00005008, Rev 0 -M6-FRP-00006001, Rev 0 -M6-FRP-00006002, Rev 0	Section 4.1.2.1; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	FRP-VSL-00002A = 472,900 FRP-VSL-00002B = 472,900 FRP-VSL-00002C = 472,900 FRP-VSL-00002D = 472,900

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-FRP-00006003, Rev 0 -M6-FRP-00006004, Rev 0 -M6-FRP-00006005, Rev 0 -M6-FRP-00006006, Rev 0 -M6-FRP-00006007, Rev 0 -M6-FRP-00006008, Rev 0 -M6-FRP-00007001, Rev 0 -M6-FRP-00007002, Rev 0 -M6-FRP-00007003, Rev 0 -M6-FRP-00007004, Rev 0 -M6-FRP-00007005, Rev 0 -M6-FRP-00007006, Rev 0 -M6-FRP-00007007, Rev 0 -M6-FRP-00007008, Rev 0 -M6-FRP-00008001, Rev 0 -M6-FRP-00008002, Rev 0 -M6-FRP-00008003, Rev 0 -M6-FRP-00008004, Rev 0 -M6-FRP-00008005, Rev 0 -M6-FRP-00008006, Rev 0 -M6-FRP-00008007, Rev 0 -M6-FRP-00009001, Rev 0 -M6-FRP-00010001, Rev 0 -M6-FRP-00020001, Rev 0 -M6-FRP-00020002, Rev 0		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-FRP-00020003, Rev 0 -M6-FRP-00020004, Rev 0 -M6-FRP-00020005, Rev 0 -M6-FRP-00020006, Rev 0 -M6-FRP-00020007, Rev 0 -MVD-FRP-00005, Rev 12 -MVD-FRP-00006, Rev 12 -MVD-FRP-00007, Rev 12 -MVD-FRP-00008, Rev 12 -N1D-FRP-00001, Rev 7 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Waste Feed Evaporation Process System FEP-VSL-00005 (Waste Feed Evaporator Condensate Vessel)	FEP	**24590-PTF** -3PS-MEVV-T0001, Rev 2 -M5-V17T-00004001, Rev 3 -M6-FEP-00001001, Rev 1 -M6-FEP-00001002, Rev 0 -M6-FEP-00001003, Rev 0 -M6-FEP-00001004, Rev 0	Section 4.1.2.2; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	FEP-VSL-00005 = 5,022 FEP-VSL-00017A = 85,496 FEP-VSL-00017B = 85,496

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
FEP-VSL-00017A (Waste Feed Evaporator Feed Vessel) FEP-VSL-00017B (Waste Feed Evaporator Feed Vessel)		-M6-FEP-00003001, Rev 0 -M6-FEP-00003002, Rev 0 -M6-FEP-00006001, Rev 1 -M6-FEP-00006002, Rev 1 -M6-FEP-00006003, Rev 1 -M6-FEP-00006004, Rev 1 -M6-FEP-00006005, Rev 0 -M6-FEP-00007001, Rev 1 -M6-FEP-00007002, Rev 1 -M6-FEP-00007003, Rev 1 -M6-FEP-00007004, Rev 1 -M6-FEP-00007005, Rev 0 -M6-FEP-00008001, Rev 0 -M6-FEP-00008002, Rev 0 -MVD-FEP-P0001, Rev 2 -MVD-FEP-P0002, Rev 2 -MVD-FEP-00003, Rev 1 -MV-FEP-P0001, Rev 0 -MV-FEP-P0002, Rev 0 -N1D-FEP-00002, Rev 6 -N1D-FEP-P0003, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev. 4		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Ultrafiltration Process System UFP-VSL-00001A (Ultrafiltration Feed Preparation Vessel) UFP-VSL-00001B (Ultrafiltration Feed Preparation Vessel) UFP-VSL-00002A (Ultrafiltration Feed Vessel) UFP-VSL-00002B (Ultrafiltration Feed Vessel) UFP-VSL-00062A (Ultrafilter Permeate Collection Vessel) UFP-VSL-00062B (Ultrafilter Permeate Collection Vessel)	UFP	**24590-PTF** -M5-V17T-00009, Rev 2 -M5-V17T-00011, Rev 2 -M6-UFP-00001001, Rev 0 -M6-UFP-00001002, Rev 0 -M6-UFP-00001003, Rev 0 -M6-UFP-00001004, Rev 0 -M6-UFP-00001005, Rev 0 -M6-UFP-00001006, Rev 0 -M6-UFP-00001007, Rev 0 -M6-UFP-00002001, Rev 0 -M6-UFP-00002002, Rev 0 -M6-UFP-00002003, Rev 0 -M6-UFP-00002004, Rev 0 -M6-UFP-00002005, Rev 0 -M6-UFP-00002006, Rev 0 -M6-UFP-00002007, Rev 1 -M6-UFP-00002008, Rev 0 -M6-UFP-00003001, Rev 0 -M6-UFP-00003002, Rev 0	Section 4.1.2.3; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	UFP-VSL-00001A = 75,594 UFP-VSL-00001B = 75,594 UFP-VSL-00002A = 39,629 UFP-VSL-00002B = 40,378 UFP-VSL-00062A = 34,700 UFP-VSL-00062B = 34,700 UFP-VSL-00062C = 34,700 UFP-FILT-00001A= 474 UFP-FILT-00001B = 474 UPF-FILT-00002A = 474

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
UFP-VSL-00062C (Ultrafilter Permeate Collection Vessel) UFP-FILT-00001A (Ultrafilter) UFP-FILT-00001B (Ultrafilter) UFP-FILT-00002A (Ultrafilter) UFP-FILT-00002B (Ultrafilter) UFP-FILT-00003A (Ultrafilter) UFP-FILT-00003B (Ultrafilter) UFP-FILT-00004A (Ultrafilter) UFP-FILT-00004B (Ultrafilter) UFP-FILT-00005A (Ultrafilter) UFP-FILT-00005B (Ultrafilter)		-M6-UFP-00003003, Rev 0 -M6-UFP-00003004, Rev 0 -M6-UFP-00003005, Rev 0 -M6-UFP-00003006, Rev 0 -M6-UFP-00003007, Rev 1 -M6-UFP-00003008, Rev 0 -M6-UFP-00004001, Rev 1 -M6-UFP-00004002, Rev 1 -M6-UFP-00004003, Rev 1 -M6-UFP-00005001, Rev 0 -M6-UFP-00005002, Rev 0 -M6-UFP-00005003, Rev 0 -M6-UFP-00005004, Rev 0 -M6-UFP-00005005, Rev 0 -M6-UFP-00005006, Rev 0 -M6-UFP-00005007, Rev 0 -M6-UFP-00006001, Rev 0 -M6-UFP-00006002, Rev 0 -M6-UFP-00006003, Rev 0 -M6-UFP-00006004, Rev 0 -M6-UFP-00006005, Rev 0 -M6-UFP-00006006, Rev 0 -M6-UFP-00006007, Rev 0 -M6-UFP-00007001, Rev 1 -M6-UFP-00007002, Rev 1		UPF-FILT-00002B = 474 UPF-FILT-00003A = 474 UPF-FILT-00003B = 474 UPF-FILT-00004A = 380 UPF-FILT-00004B = 380 UPF-FILT-00005A = 380 UPF-FILT-00005B = 380

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-UFP-00007003, Rev 1 -M6-UFP-00007004, Rev 1 -M6-UFP-00007005, Rev 1 -M6-UFP-00007006, Rev 1 -M6-UFP-00007007, Rev 1 -M6-UFP-00009001, Rev 0 -M6-UFP-00009002, Rev 0 -M6-UFP-00009003, Rev 0 -M6-UFP-00009004, Rev 0 -M6-UFP-00009005, Rev 0 -M6-UFP-00009006, Rev 0 -M6-UFP-00010001, Rev 0 -M6-UFP-00010002, Rev 0 -M6-UFP-00010003, Rev 0 -M6-UFP-00010004, Rev 0 -M6-UFP-00010005, Rev 0 -M6-UFP-00010006, Rev 0 -M6-UFP-00010007, Rev 0 -M6-UFP-00011001, Rev 0 -M6-UFP-00011002, Rev 0 -M6-UFP-00011003, Rev 0 -M6-UFP-00011004, Rev 0 -M6-UFP-00011005, Rev 0 -M6-UFP-00015001, Rev 0 -M6-UFP-00015002, Rev 0		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-UFP-00016001, Rev 0 -M6-UFP-00017001, Rev 0 -M6-UFP-00021001, Rev 0 -M6-UFP-00021002, Rev 0 -M6-UFP-00022001, Rev 0 -M6-UFP-00022002, Rev 0 -M6-UFP-00027001, Rev 0 -M6-UFP-00027002, Rev 0 -M6-UFP-00027003, Rev 0 -M6-UFP-00027004, Rev 0 -M6-UFP-00027005, Rev 0 -M6-UFP-00027006, Rev 0 -M6-UFP-00027007, Rev 0 -MLD-UFP-P0007, Rev 1 -MVD-UFP-00001, Rev 12 -MVD-UFP-00014, Rev 11 -MVD-UFP-00015, Rev 11 -MVD-UFP-00002, Rev 12 -MVD-UFP-00005. Rev 11 -MVD-UFP-00006, Rev 11 -MVD-UFP-00007, Rev 11 -MV-UFP-00001001, Rev 1 -MV-UFP-00001002, Rev 1 -MV-UFP-00001003, Rev 1 -MV-UFP-00002001, Rev 1		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MV-UFP-00002002, Rev 1 -MV-UFP-00002003, Rev 1 -MV-UFP-00003, Rev 6 -MV-UFP-00004, Rev 6 -MV-UFP-P0005, Rev 0 -MV-UFP-P0006, Rev 0 -MV-UFP-P0007, Rev 0 -MV-UFP-00016, Rev 3 -MV-UFP-00017, Rev 3 -MV-UFP-00018, Rev 3 -MV-UFP-00028, Rev 1 -MV-UFP-00029, Rev 1 -MV-UFP-00030, Rev 1 -MV-UFP-00031, Rev 1 -N1D-UFP-P0001, Rev 2 -N1D-UFP-P0002, Rev 2 -N1D-UFP-P0003, Rev 5 -N1D-UFP-P0004, Rev 3 -N1D-UFP-P0005, Rev 2 -N1D-UFP-P0008, Rev 2 -N1D-UFP-00009, Rev 0 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
<u>HLW Lag Storage and Feed Blending Process System</u> HLP-VSL-00022 (HLW Feed Receipt Vessel) HLP-VSL-00027A (HLW Lag Storage Vessel) HLP-VSL-00027B (HLW Lag Storage Vessel) HLP-VSL-00028 (HLW Feed Blend Vessel)	HLP	**<u>24590-PTF</u>** -M5-V17T-00007, Rev 2 -M5-V17T-00008, Rev 3 -M6-HLP-00001001, Rev 0 -M6-HLP-00001002, Rev 0 -M6-HLP-00001003, Rev 1 -M6-HLP-00001004, Rev 0 -M6-HLP-00002001, Rev 0 -M6-HLP-00002002, Rev 1 -M6-HLP-00003001, Rev 0 -M6-HLP-00003002, Rev 1 -M6-HLP-00003003, Rev 1 -M6-HLP-00005001, Rev 0 -M6-HLP-00005002, Rev 0 -M6-HLP-00005003, Rev 0 -M6-HLP-00005004, Rev 0 -M6-HLP-00005005, Rev 0 -M6-HLP-00005006, Rev 0 -M6-HLP-00005007, Rev 0 -M6-HLP-00006001, Rev 0 -M6-HLP-00006002, Rev 0 -M6-HLP-00006003, Rev 0	Section 4.1.2.4; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	HLP-VSL-00022 = 268,800 HLP-VSL-00027A = 127,260 HLP-VSL-00027B = 127,260 HLP-VSL-00028 = 142,200

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-HLP-00006004, Rev 0 -M6-HLP-00006005, Rev 0 -M6-HLP-00006006, Rev 0 -M6-HLP-00006007, Rev 0 -M6-HLP-00007001, Rev 0 -M6-HLP-00007002, Rev 0 -M6-HLP-00007003, Rev 0 -M6-HLP-00007004, Rev 0 -M6-HLP-00007005, Rev 0 -M6-HLP-00007006, Rev 0 -M6-HLP-00007007, Rev 0 -M6-HLP-00009001, Rev 0 -M6-HLP-00009002, Rev 0 -M6-HLP-00009003, Rev 0 -M6-HLP-00010001, Rev 0 -M6-HLP-00010002, Rev 0 -M6-HLP-00010003, Rev 0 -M6-HLP-00027001, Rev 0 -M6-HLP-00027002, Rev 0 -M6-HLP-00027003, Rev 0 -M6-HLP-00027004, Rev 0 -M6-HLP-00027005, Rev 0 -M6-HLP-00027006, Rev 0 -M6-HLP-00028004, Rev 0 -M6-HLP-00028005, Rev 0		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-HLP-00028006, Rev 0 -MVD-HLP-00006, Rev 8 -MVD-HLP-00007, Rev 8 -MVD-HLP-00008, Rev 9 -MVD-HLP-00009, Rev 8 -MV-HLP-00003001, Rev 0 -MV-HLP-00004, Rev 2 -MV-HLP-00005, Rev 2 -MV-HLP-00006, Rev 2 -N1D-HLP-00001, Rev 6 -N1D-HLP-P0003, Rev 1 -N1D-HLP-00007, Rev 6 -N1D-HLP-00010, Rev 6 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0003, Rev 3		

<u>Cesium Ion Exchange Process System</u> CXP-VSL-00004 (Cesium Ion Exchange Feed CXP-VSL-00026A (Cesium Ion Exchange Treated LAW Collection Vessel) CXP-VSL-00026B (Cesium Ion Exchange Treated LAW Collection Vessel) CXP-VSL-00026C (Cesium Ion Exchange Treated LAW Collection Vessel) CXP-IXC-00001 (Cesium Ion Exchange Column) CXP-IXC-00002 (Cesium Ion Exchange Column) CXP-IXC-00003 (Cesium Ion Exchange Column) CXP-IXC-00004 (Cesium Ion Exchange Column)	CXP	**<u>24590-PTF</u>** -M5-V17T-00012001, Rev 0 -M5-V17T-00012002, Rev 0 -M5-V17T-00013, Rev 3 -M5-V17T-00025, Rev 1 -M6-CXP-00001002, Rev 1 -M6-CXP-00001003, Rev 1 -M6-CXP-00001004, Rev 2 -M6-CXP-00001006, Rev 0 -M6-CXP-00001007, Rev 0 -M6-CXP-00002001, Rev 1 -M6-CXP-00002002, Rev 1 -M6-CXP-00003001, Rev 1 -M6-CXP-00003002, Rev 1 -M6-CXP-00003003, Rev 0 -M6-CXP-00005001, Rev 1 -M6-CXP-00005002, Rev 1 -M6-CXP-00005003, Rev 1 -M6-CXP-00005004, Rev 0 -M6-CXP-00007, Rev 2 -M6-CXP-000100001, Rev 0 -M6-CXP-000100002, Rev 0 -M6-CXP-000100003, Rev 0 -M6-CXP-000100004, Rev 0 -M6-CXP-00011001, Rev 0 -M6-CXP-00011002, Rev 0 -M6-CXP-00011003, Rev 0 -M6-CXP-00011004, Rev 0 -M6-CXP-00011005, Rev 0	Section 4.1.2.5; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	CXP-VSL-00004 = 10,633 CXP-VSL-00026A = 38,000 CXP-VSL-00026B = 38,000 CXP-VSL-00026C = 38,000 CXP-IXC-00001 = 680 CXP-IXC-00002= 680 CXP-IXC-00003 = 680 CXP-IXC-00004 = 680

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-CXP-00011006, Rev 0 -M6-CXP-00011007, Rev 0 -M6-CXP-00012001, Rev 0 -M6-CXP-00012002, Rev 0 -M6-CXP-00012003, Rev 0 -M6-CXP-00012004, Rev 0 -M6-CXP-00013, Rev 2 -MV-CXP-P0002, Rev 0 -MV-CXP-P0008, Rev 0 -MV-CXP-P0009, Rev 0 -MV-CXP-P0010, Rev 0 -MVD-CXP-P0015, Rev 0 -MVD-CXP-P0021, Rev 1 -MVD-CXP-P0022, Rev 1 -MVD-CXP-P0023, Rev 1 -N1D-CXP-P0003, Rev 1 -N1D-CXP-P0007, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Cesium Nitric Acid Recovery Process System CNP-VSL-00001 (Cesium Evaporator Eluant Lute Pot) CNP-VSL-00003 (Eluate Contingency Storage Vessel) CNP-VSL-00004 (Cesium Evaporator Recovered Nitric Acid Vessel)	CNP	**24590-PTF** -M5-V17T-00014, Rev 2 -M6-CNP-00001001, Rev 0 -M6-CNP-00001002, Rev. 0 -M6-CNP-00001003, Rev. 0 -M6-CNP-00002001, Rev 0 -M6-CNP-00002002, Rev 0 -M6-CNP-00002003, Rev 0 -M6-CNP-00003001, Rev 0 -M6-CNP-00003002, Rev 0 -M6-CNP-00003003, Rev 0 -M6-CNP-00003004, Rev 0 -M6-CNP-00004, Rev 3 -M6-CNP-00005, Rev 2 -MV-CNP-P0001, Rev 1 -MV-CNP-P0002, Rev 1 -MV-CNP-P0005, Rev 0 -MVD-CNP-P0003, Rev 1 -MVD-CNP-P0007, Rev 2 -MVD-CNP-P0010, Rev 0 -N1D-CNP-P0006, Rev 3 -N1D-CNP-P0009, Rev 1 -N1D-CNP-P0011, Rev 1 -P1-P01T-00001, Rev 7	Section 4.1.2.6; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	CNP-VSL-00001 = 109 CNP-VSL-00003 = 21,713 CNP-VSL-00004 = 11,115

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Treated LAW Concentrate Storage Process System TCP-VSL-00001 (Treated LAW Concentrate Storage Vessel)	TCP	**24590-PTF** -M5-V17T-00006, Rev 1 -M6-TCP-00001001, Rev 0 -M6-TCP-00001002, Rev 0 -M6-TCP-00001003, Rev 0 -M6-TCP-00002001, Rev 1 -M6-TCP-00002002, Rev 1 -M6-TCP-00002003, Rev 1 -M6-TCP-00002004, Rev 1 -M6-TCP-00002005, Rev 1 -MV-TCP-P0002, Rev 1 -MVD-TCP-P0002, Rev 2 -N1D-TCP-P0001, Rev 2 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4.2.2.12; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	TCP-VSL-00001 = 146,740
Treated LAW Evaporation Process System TLP-VSL-00002 (Treated LAW Evaporator Condensate Vessel)	TLP	**24590-PTF** -3PS-MEVV-T0001, Rev 3 -M5-V17T-00005, Rev 2 -M6-TLP-00001, Rev 3 -M6-TLP-00002001, Rev 0	Section 4.1.2.11; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	TLP-VSL-00002 = 2,227 TLP-VSL-00009A = 130,010 TLP-VSL-00009B = 130,010

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
TLP-VSL-00009A (LAW SBS Condensate Receipt Vessel) TLP-VSL-00009B (LAW SBS Condensate Receipt Vessel)		-M6-TLP-00002002, Rev 0 -M6-TLP-00002003, Rev 0 -M6-TLP-00002004, Rev 0 -M6-TLP-00003001, Rev 0 -M6-TLP-00003002, Rev 0 -M6-TLP-00003003, Rev 0 -M6-TLP-00003004, Rev 0 -M6-TLP-00005001, Rev 0 -M6-TLP-00005002, Rev 0 -M6-TLP-00005003, Rev 0 -M6-TLP-00005004, Rev 0 -M6-TLP-00005005, Rev 0 -M6-TLP-00006001, Rev 0 -M6-TLP-00006002, Rev 0 -M6-TLP-00006003, Rev 0 -M6-TLP-00006004, Rev 0 -M6-TLP-00006005, Rev 0 -MVD-TLP-P0001, Rev 2 -MVD-TLP-P0002, Rev 2 -MVD-TLP-00004, Rev 1 -MV-TLP-P0001, Rev 1 -MV-TLP-P0002, Rev 1 -N1D-TLP-P0001, Rev 2 -N1D-TLP-P0006, Rev 1 -P1-P01T-00001, Rev 7		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-P1-P01T-P0002, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Spent Resin and Dewatering Process System RDP-VSL-00002A (Spent Resin Slurry Vessel) RDP-VSL-00002B (Spent Resin Slurry Vessel) RDP-VSL-00002C (Spent Resin Slurry Vessel) RDP-VSL-00004 (Spent Resin Dewatering Moisture Separation Vessel)	RDP	**24590-PTF** -3PS-MWD0-TP003, Rev 1 -M5-V17T-00020, Rev 2 -M6-RDP-00001001, Rev 0 -M6-RDP-00001002, Rev 0 -M6-RDP-00001003, Rev 0 -M6-RDP-00001004, Rev 0 -M6-RDP-00001005, Rev 0 -M6-RDP-00002, Rev 4 -M6-RDP-00006, Rev 3 -MVD-RDP-P0005, Rev 1 -MVD-RDP-P0006, Rev 1 -MVD-RDP-P0007, Rev 3 -MVD-RDP-P0008, Rev 0 -MV-RDP-P0001, Rev 0 -MV-RDP-P0002, Rev 0 -MV-RDP-P0003, Rev 0 -P1-P01T-00001, Rev 7	Section 4.1.2.13; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	RDP-VSL-00002A = 15,230 RDP-VSL-00002B = 15,230 RDP-VSL-00002C = 15,230 RDP-VSL-00004 = 101

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Pretreatment Plant Radioactive Liquid Waste Disposal System RLD-TK-00006A (Process Condensate Tank) RLD-TK-00006B (Process Condensate Tank) RLD-VSL-00017A (Alkaline Effluent Vessel) RLD-VSL-00017B (Alkaline Effluent Vessel)	RLD	**24590-PTF** -M5-V17T-00022003, Rev 2 -M5-V17T-00022004, Rev 3 -M6-RLD-00001001, Rev 0 -M6-RLD-00001002, Rev 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00001004, Rev 0 -M6-RLD-00002001, Rev 0 -M6-RLD-00002002, Rev 0 -M6-RLD-00002003, Rev 0 -M6-RLD-00003001, Rev 0 -M6-RLD-00003002, Rev 0 -M6-RLD-00003003, Rev 0 -M6-RLD-00004, Rev 2 -M6-RLD-00005, Rev 3 -M6-RLD-00006, Rev 3 -M6-RLD-00007001, Rev 0 -MVD-RLD-P0005, Rev 3 -MVD-RLD-P0006, Rev 3 -MV-RLD-P0001, Rev 0	Section 4.1.2.16; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	RLD-TK-00006A = 343,734 RLD-TK-00006B = 343,734 RLD-VSL-00017A = 34,340 RLD-VSL-00017B = 34,340

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MV-RLD-P0002, Rev 0 -N1D-RLD-P0002, Rev 2 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Pretreatment Plant Wash and Disposal System PWD-VSL-00015 (Acidic/Alkaline Effluent Vessel) PWD-VSL-00016 (Acidic/Alkaline Effluent Vessel) PWD-VSL-00033 (Ultimate Overflow Vessel) PWD-VSL-00043 (HLW Effluent Transfer Vessel) PWD-VSL-00044 (Plant Wash Vessel)	PWD	**24590-PTF** -M5-V17T-00022001, Rev 2 -M5-V17T-00022002, Rev 2 -M6-PWD-00001, Rev 2 -M6-PWD-00002001, Rev 0 -M6-PWD-00002002, Rev 0 -M6-PWD-00003001, Rev 0 -M6-PWD-00003002, Rev 0 -M6-PWD-00003003, Rev 0 -M6-PWD-00003004, Rev 0 -M6-PWD-00005, Rev 3 -M6-PWD-00006, Rev 2 -M6-PWD-00007, Rev 3 -M6-PWD-00008, Rev 3 -M6-PWD-00009, Rev 3 -M6-PWD-00010, Rev 3	Section 4.1.2.15; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	PWD-VSL-00015 = 119,150 PWD-VSL-00016 = 119,150 PWD-VSL-00033 = 41,650 PWD-VSL-00043 = 41,650 PWD-VSL-00044 = 103,024 PWD-VSL-00046 = 4,982

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
PWD-VSL-00046 (C3 Floor Drain Collection Vessel)		-M6-PWD-00011, Rev 2 -M6-PWD-00012, Rev 2 -M6-PWD-00014, Rev 3 -M6-PWD-P0018, Rev 0 -M6-PWD-P0019, Rev 0 -M6-PWD-00020001, Rev 0 -M6-PWD-00020002, Rev 0 -M6-PWD-00020003, Rev 0 -M6-PWD-00020004, Rev 0 -M6-PWD-00020005, Rev 0 -M6-PWD-00020006, Rev 0 -M6-PWD-00021001, Rev 0 -M6-PWD-00021002, Rev 0 -M6-PWD-00021003, Rev 0 -M6-PWD-00021004, Rev 0 -M6-PWD-00021005, Rev 0 -M6-PWD-00021006, Rev 0 -M6-PWD-00023001, Rev 0 -M6-PWD-00023002, Rev 0 -M6-PWD-00023003, Rev 0 -M6-PWD-00023004, Rev 0 -M6-PWD-00023005, Rev 0 -M6-PWD-00024001, Rev 0 -M6-PWD-00024002, Rev 0 -M6-PWD-00024003, Rev 0		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-PWD-00024004, Rev 0 -M6-PWD-00024005, Rev 0 -M6-PWD-00024006, Rev 0 -M6-PWD-00024007, Rev 0 -M6-PWD-00025001, Rev 0 -M6-PWD-00025002, Rev 0 -M6-PWD-00025003, Rev 0 -M6-PWD-00025004, Rev 0 -M6-PWD-00026, Rev 2 -M6-PWD-00029, Rev 3 -M6-PWD-00033, Rev 2 -M6-PWD-00041, Rev 3 -M6-PWD-00043, Rev3 -M6-PWD-00044, Rev 3 -M6-PWD-00046, Rev 2 -M6-PWD-00050, Rev 2 -M6-PWD-00051, Rev 2 -M6-PWD-00057, Rev 4 -M6-PWD-00058, Rev 4 -MVD-PWD-P0001, Rev 3 -MVD-PWD-P0002, Rev 3 -MVD-PWD-P0003, Rev 2 -MVD-PWD-P0010, Rev 1 -MVD-PWD-P0011, Rev 3 -MVD-PWD-P0012, Rev 3		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MV-PWD-P0001001, Rev 1 -MV-PWD-P0001002, Rev 1 -MV-PWD-P0003001 , Rev 1 -MV-PWD-P0003002, Rev 1 -MV-PWD-P0005, Rev 1 -MV-PWD-P0006, Rev 1 -MV-PWD-P0007, Rev 1 -MV-PWD-P0010, Rev 1 -N1D-PWD-P0001, Rev 1 -N1D-PWD-P0002, Rev 5 -N1D-PWD-P0003, Rev 3 -N1D-PWD-P0005, Rev 2 -N1D-PWD-P0006, Rev 2 -P1-P01T-00001, Rev 7 -P1-P01T-00006, Rev 4		
<u>**Pretreatment Vessel Vent Process System**</u> PVP-VSL-00001 (Vessel Vent HEME Drain Collection Vessel)	PVP	<u>**24590-PTF**</u> -M5-V17T-00021001, Rev 2 -M5-V17T-00021002, Rev 2 -M5-V17T-00021004, Rev 2 -M6-PVP-00002, Rev 3 -M6-PVP-00004001, Rev 0 -M6-PVP-00004002, Rev 0 -M6-PVP-00017001, Rev 0 -M6-PVP-00017002, Rev 0 -M6-PVP-00017003, Rev 0	Section 4.1.2.16; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	PVP-VSL-00001 = 1,969

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-PVP-00018001, Rev 1 -M6-PVP-00018002, Rev 0 -MVD-PVP-P0001, Rev 0 -MV-PVP-P0002, Rev 1 -N1D-PVP-P0002, Rev 1 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Pretreatment In-Cell Handling System PIH-TK-00001 (Decontamination Soak Tank)	PIH	**24590-PTF** -M6-PIH-00001001, Rev 0 -M6-PIH-00001002, Rev 0 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-HD00-T0001, Rev 4	Section 4.1.2.14; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	PIH-TK-00001 = 1504

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Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LAW Concentrate Receipt Process System LCP-VSL-00001 (LAW Melter 1 Concentrate Receipt Vessel) LCP-VSL-00002 (LAW Melter 2 Concentrate Receipt Vessel)	LCP	**24590-LAW** -M5-V17T-P0001, Rev 0 -M5-V17T-P0002, Rev 0 -M6-LCP-00001002, Rev 0 -M6-LCP-00001003, Rev 0 -M6-LCP-00002003, Rev 0 -M6-LCP-00002004, Rev 0 -MV-LCP-P0001, Rev 0 -MV-LCP-P0002, Rev 0 -MVD-LCP-P0004, Rev 1 -MVD-LCP-P0005, Rev 1 -N1D-LCP-P0001, Rev 1 -P1-P01T-00002, Rev 7	Section 4.1.3.1; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	LCP-VSL-00001 = 18,130 LCP-VSL-00002 = 18,130
LAW Melter Feed Process System LFP-VSL-00001 (Melter 1 Feed Preparation Vessel) LFP-VSL-00002 (Melter 1 Feed Vessel) LFP-VSL-00003 (Melter 2 Feed Preparation Vessel)	LFP	**24590-LAW** -M5-V17T-P0001, Rev 0 -M5-V17T-P0002, Rev 0 -M6-LFP-00001001, Rev 0 -M6-LFP-00001002, Rev 0 -M6-LFP-00001003, Rev 0 -M6-LFP-00001004, Rev 0 -M6-LFP-00001005, Rev 0 -M6-LFP-00001006, Rev 0 -M6-LFP-00003001, Rev 0 -M6-LFP-00003002, Rev 0	Section 4.1.3.1; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	LFP-VSL-00001 = 9,123 LFP-VSL-00002 = 9,123 LFP-VSL-00003 = 9,123 LFP-VSL-00004 = 9,123

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LFP-VSL-00004 (Melter 2 Feed Vessel)		-M6-LFP-00003003, Rev 0 -M6-LFP-00003004, Rev 0 -M6-LFP-00003005, Rev 0 -M6-LFP-00003006, Rev 0 -MV-LFP-P0001, Rev 0 -MV-LFP-P0002, Rev 0 -MV-LFP-P0004, Rev 0 -MV-LFP-P0005, Rev 0 -MVD-LFP-P0007, Rev 1 -MVD-LFP-P0008, Rev 1 -MVD-LFP-P0010, Rev 1 -MVD-LFP-P0011, Rev 1 -P1-P01T-00002, Rev 7 -N1D-LFP-00004, Rev 2 -N1D-LFP-00006, Rev 0		
<u>**LAW Secondary Off-gas/Vessel Vent Process System**</u> LVP-TK-00001 (LAW Caustic Collection Tank)	LVP	<u>**24590-LAW**</u> -M5-V17T-P0011, Rev 1 -P1-P01T-00004, Rev 5 -VDCN-M-13-00001 -MTD-LVP-00001, Rev 1 -N1D-LVP-00002, Rev 2	Section 4.1.3.3; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	LVP-TK-00001= 14,232
<u>**LAW Primary Off-gas Process System**</u>	LOP	<u>**24590-LAW**</u> -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0	Section 4.1.3.3; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	LOP-VSL-00001 = 9,056 LOP-VSL-00002 = 9,056

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LOP-VSL-00001 (LAW Melter 1 SBS Condensate Vessel) LOP-VSL-00002 (LAW Melter 2 SBS Condensate Vessel)		-M6-LOP-P0001, Rev 2 -M6-LOP-P0002, Rev2 -MV-LOP-P0001, Rev 0 -MV-LOP-P0002, Rev 0 -MVD-LOP-P0004, Rev 1 -MVD-LOP-P0005, Rev 1 -N1D-LOP-00002, Rev 3 -P1-P01T-00002, Rev 7		
LAW Vitrification Plant Radioactive Liquid Waste Disposal System RLD-VSL-00003 (Plant Wash Vessel) RLD-VSL-00004 (C3/C5 Drains/Sump Collection Vessel) RLD-VSL-00005 (SBS Condensate Collection Vessel)	RLD	**24590-LAW** -M5-V17T-P0014, Rev 2 -M6-RLD-00001001, Rev 0 -M6-RLD-00001002, Rev 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00001004, Rev 0 -M6-RLD-00001005, Rev 0 -M6-RLD-00001006, Rev 0 -M6-RLD-00002001, Rev 0 -M6-RLD-00002002, Rev 0 -M6-RLD-00002003, Rev 0 -M6-RLD-00002004, Rev 0 -M6-RLD-00002005, Rev 0 -M6-RLD-00003001, Rev 0 -M6-RLD-00003002, Rev 1 -M6-RLD-00003003, Rev 1	Section 4.1.3.4; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	RLD-VSL-00003 = 25,780 RLD-VSL-00004 = 7696 RLD-VSL-00005 = 25,780

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MVD-RLD-P0001, Rev 1 -MVD-RLD-P0006, Rev 2 -MVD-RLD-P0007, Rev 2 -MV-RLD-P0001, Rev 2 -MV-RLD-P0002, Rev 1 -MV-RLD-P0003, Rev 1 -P1-P01T-00001, Rev 4 -P1-P01T-00002, Rev 7 -N1D-RLD-00001, Rev 5 -N1D-RLD-00002, Rev 3 -N1D-RLD-00005, Rev 4		

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
HLW Concentrate Receipt Process System The HCP System has ancillary equipment only	HCP	**24590-HLW** -M5-V17T-00001, Rev 5 -M6-HCP-00001001, Rev 1 -M6-HCP-00002001, Rev 1	Section 4.1.4.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	
HLW Melter Feed Process System HFP-VSL-00001 (Melter 1 Feed Preparation Vessel)	HFP	**24590-HLW** -3YD-HFP-00001[a] -M5-V17T-00001, Rev 5 -P1-P01T-00002, Rev 7 -M6-HFP-00001001, Rev 0 -M6-HFP-00001002, Rev 0 -M6-HFP-00001003, Rev 0 -M6-HFP-00001004, Rev 0 -M6-HFP-00007001, Rev 0 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4.1.4.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HFP-VSL-00001 = 8,311
Melter Feed Process System cont. HFP-VSL-00002 (Melter 1 Feed Vessel)	HFP	**24590-HLW** -3YD-HFP-00001[a] -M5-V17T-00001, Rev 5 -P1-P01T-00002, Rev 7 -M6-HFP-00002001, Rev 0	Section 4.1.4.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HFP-VSL-00002 = 8,311

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-HFP-00002002, Rev 0 -M6-HFP-00002003, Rev 0 -M6-HFP-00008001, Rev 0 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Melter Feed Process System cont. HFP-VSL-00005 (Melter 2 Feed Preparation Vessel)	HFP	**24590-HLW** -3YD-HFP-00001[a] -M5-V17T-00001, Rev 5 -P1-P01T-00002, Rev 7 -M6-HFP-20001001, Rev 0 -M6-HFP-20001002, Rev 0 -M6-HFP-20001003, Rev 0 -M6-HFP-20001004, Rev 0 -M6-HFP-20007001, Rev 0 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4.1.4.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HFP-VSL-00005 = 8,311

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Melter Feed Process System cont. HFP-VSL-00006 (Melter 2 Feed Vessel)	HFP	**24590-HLW** -3YD-HFP-00001[a] -M5-V17T-00001, Rev 5 -P1-P01T-00002, Rev 7 -M6-HFP-20002001, Rev 3 -M6-HFP-20002002, Rev 3 -M6-HFP-20002003, Rev 3 -M6-HFP-20008001, Rev 0 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4.1.4.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HFP-VSL-00006 = 8,311
Melter Off-gas Treatment Process System HOP-VSL-00903 (Melter 1 SBS Condensate Receiver Vessel) HOP-VSL-00904 (Melter 2 SBS Condensate Receiver Vessel)	HOP	**24590-HLW** -3YD-HOP-00001[a] -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00004, Rev 4 -M6-HOP-00006001, Rev 0 -M6-HOP-00006002, Rev 0 -M6-HOP-20004, Rev 5 -M6-HOP-20006001, Rev 0 -M6-HOP-20006002, Rev 0 -MVD-HOP-P0001, Rev 2	Section 4.1.4.3; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HOP-VSL-00903 = 9891 HOP-VSL-00904 = 9891

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MVD-HOP-P0012, Rev 1 -MV-HOP-P0001, Rev 2 -MV-HOP-P0003, Rev 2 -N1D-HOP-P0009, Rev 2 -P1-P01T-00001, Rev 9 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
HLW Canister Decontamination Handling System HDH-VSL-00001 (Canister Rinse Vessel) HDH-VSL-00002 (Canister Decon Vessel 1) HDH-VSL-00003 (Waste Neutralization Vessel) HDH-VSL-00004 (Canister Decon Vessel 2)	HDH	**24590-HLW** -M5-V17T-00006, Rev 6 -M6-HDH-00001001, Rev 1 -M6-HDH-00002001, Rev 1 -M6-HDH-00002002, Rev 0 -M6-HDH-00002003, Rev 1 -M6-HDH-20001001, Rev 1 -M6-HDH-20001002, Rev 0 -M0-HDH-P0012001, Rev 1 -M0-HDH-P0012002, Rev 1 -MV-HDH-P0003, Rev 1 -MVD-HDH-P0003, Rev 2 -MVD-HDH-00006, Rev 5 -MVD-HDH-P0009, Rev 0 -N1D-HDH-00003, Rev 8	Section 4.1.4.7; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HDH-VSL-00001 = 3314 HDH-VSL-00002 = 630 HDH-VSL-00003 = 5315 HDH-VSL-00004 = 630

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-N1D-HDH-P0005, Rev 1 -N1D-HDH-P0007, Rev 1 -P1-P01T-00001, Rev 9 -P1-P01T-00002, Rev 7 -3YD-HDH-00002[a] **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
HLW Melter Cave Support Handling System HSH-TK-00001 (Decontamination Tank Melter Cave 1) HSH-TK-00002 (Decontamination Tank Melter Cave 2)	HSH	**24590-HLW** -M6-HSH-00004001, Rev 1 -M6-HSH-00004001, Rev 1 -M6-HSH-20004001, Rev 1 -M6-HSH-20004002, Rev 1 -M0-HSH-P0072, Rev 1 -N1D-HSH-P0001, Rev 1 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-HD00-T0001, Rev 4	Section 4.1.4.7; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HSH-TK-00001 = 4,000 HSH-TK-00002 = 4,000
HLW Vitrification Plant Radioactive Liquid Waste Disposal System	RLD	**24590-HLW** -3YD-RLD-00001[a] -M5-V17T-P0007001, Rev 1	Section 4.1.5.5; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of	RLD-VSL-00002 = 334

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
RLD-VSL-00002 (Off-gas Drains Collection Vessel) RLD-VSL-00007 (Acidic Waste Vessel) RLD-VSL-00008 (Plant Wash & Drain Vessel)		-M5-V17T-P0007002, Rev 1 -M6-RLD-00001001, Rev 0 -M6-RLD-00001002, Rev. 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00002001, Rev 0 -M6-RLD-00002002, Rev 0 -M6-RLD-00002003, Rev 0 -M6-RLD-00002004, Rev 0 -M6-RLD-00006, Rev 4 -M6-RLD-00007, Rev 4 -M6-RLD-00014, Rev 5 -MV-RLD-00002, Rev 2 -MV-RLD-00003, Rev 0 -MV-RLD-00025001 Rev 0 -MV-RLD-00025002, Rev 0 -MV-RLD-00025003, Rev 0 -MV-RLD-00025004, Rev 0 -MVD-RLD-00005, Rev 9 -MVD-RLD-00007, Rev 7 -MVD-RLD-00008, Rev 4 -N1D-RLD-P0001, Rev 0 -N1D-RLD-P0006, Rev 0 -N1D-RLD-P0013, Rev 0 -P1-P01T-00001, Rev 9 -P1-P01T-00002, Rev 7	Operating Unit Group 10, Addendum C of this Permit.	RLD-VSL-00007 = 18,145 RLD-VSL-00008 = 13,774

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
[a]System Descriptions are maintained in the Administrative Record, and are listed here for information only.				

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Table III.10.E.D – Analytical Laboratory Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Radioactive Liquid Waste Disposal System RLD-VSL-00164 (Laboratory Area Sink Drain Collection Vessel) RLD-VSL-00165 (Hot Cell Drain Collection Vessel)	RLD	**24590-LAB** -3YD-RLD-00001[a] -M5-V17T-00029, Rev 3 -M6-RLD-00001001, Rev 1 -M6-RLD-00001002, Rev 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00001004, Rev 0 -M6-RLD-00002001, Rev 1 -M6-RLD-00002003, Rev 0 -M6-RLD-00006001, Rev 0 -M6-RLD-00006002, Rev 0 -M6-RLD-00006003, Rev 0 -M6-RLD-00007001, Rev 0 -M6-RLD-00007002, Rev 0 -M6-RLD-00008001, Rev 0 -M6-RLD-00008002, Rev 0 -MVD-RLD-P0164, Rev 1 -MVD-RLD-P0165, Rev 1 -MV-RLD-P0001, Rev 0 -N1D-RLD-P0002, Rev 1 -N1D-RLD-P0003, Rev 1 -P1-60-00007, Rev 3 -P1-60-00008, Rev 3	Section 4.1.5.5; Table C-5 and 4-6 of Operating Unit Group 10, Addendum C of this Permit.	RLD-VSl-00164 = 3180 RLD-VSL-00165 = 9100

Table III.10.E.D – Analytical Laboratory Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		

[a]System Descriptions are maintained in the Administrative Record, and are listed here for information only.

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Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00071[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00040[a]	Not Applicable	Bubbler Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00001A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00002A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00004[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00006[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00007[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00008[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00009[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00010[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00011[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00012[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00013[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00026[c]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00026[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00028[c]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00028[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00029[c]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00029[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00031[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00032[c]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00032[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00033[c]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00033[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00034[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00035[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00036[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00037[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PVP-BULGE-00001	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PVP-BULGE-00002	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
TCP-BULGE-00004	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
DIW-BULGE-00001	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
DIW-BULGE-00002	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
CRP-BULGE-00001	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
CXP-BULGE-00004	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
UFP-BULGE-00001	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
UFP-BULGE-00002	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
UFP-BULGE-00005	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
UFP-BULGE-00006	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00001	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00002	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00003	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00004	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00005	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-LDB-00006	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00007	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00008	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00009	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00010	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00011	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00012	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00013	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-LDB-00014	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00015	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00016	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00017	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00018	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00019	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00012	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00013	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
ASX Sampler 00013 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00017 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00019 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00020 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00025 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range

[a]Locator (including P&ID designator) is located on Permit Table III.10.E J – Pretreatment Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.

[b]Locator (including P&ID designator) is located on Permit Table III.10.E.I – Pretreatment Plant Tank Systems Primary Containment Systems.

[c]Leak detection instruments for secondary containment to a primary containment sump.

Table III.10.E.F – LAW Vitrification Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
RLD-SUMP-00028[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00029[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00030[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00031[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00032[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00035[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00036[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
LVP-FD-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
Melter 1 Encasement	Not Applicable	Conductivity Cable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

Assembly Drain									
Melter 2 Encasement Assembly Drain	Not Applicable	Conductivity Cable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00012 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00013 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
		RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
		RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Locator (including P&ID designator) is located on Permit Table III.10.E L - LAW Vitrification Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.									

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Table III.10.E.G - HLW Vitrification Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
HCP-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HOP-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HOP-SUMP-00008[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HDH-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HDH-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HDH-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HFP-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HFP-SUMP-00005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00003[a]	Not Applicable	Bubbler	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00007[a]	Not Applicable	Bubbler	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

HSH-SUMP-00008[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00009[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HPH-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HPH-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HPH-SUMP-00005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
ASX Sampler 00028 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
ASX Sampler 00029 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
ASX Sampler 00042 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Locator (including P&ID designator) is located on Permit Table III.10.E. N - HLW Vitrification Plant Tank Systems Secondary Containment Systems Including Sumps, and Floor Drains.									

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Table III.10.E.H – Laboratory Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
RLD-SUMP-00041[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00042[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00043A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00043B[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00044[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00045[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00002[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00004[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00005[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00006[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.H – Laboratory Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
RLD-LDB-00007[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00008[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00009[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00011[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Locator (including P&ID designator) is located on Permit Table III.10.E P - Laboratory Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.

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Table III.10.E.I – Pretreatment Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
PWD-SUMP-00026 P-0123 (Hot Cell El. 0)	RESERVED	RESERVED	RESERVED
PWD-SUMP-00028 P-0123 (Hot Cell El. 0)	RESERVED	RESERVED	RESERVED
PWD-SUMP-00029 P-0123 (Hot Cell El. 0)	RESERVED	RESERVED	RESERVED
PWD-SUMP-00032 P-0123A (Maintenance Cave, El. 0)	RESERVED	RESERVED	RESERVED
PWD-SUMP-00033 P-0123A (Maintenance Cave, El. 0)	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.

[b] Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

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Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-SUMP-00071 P-B005 (Pit-19, El. –19')	60	Dry Sump	30"Dia x 18"Deep Epoxy	**24590-PTF** -M6-PWD-00041, Rev 3 -P1-P01T-00006, Rev 4
PWD-SUMP-00040	233.7	Dry Sump	60"x30"x30"	**24590-PTF**

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
P-B002 (Pit-45, El. –45')			Stainless Steel	-M6-PWD-00012, Rev 2 -P1-P01T-00006, Rev 4
PWD-SUMP-00001 P-0108B (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00001A P-0108C (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00010, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00002 P-0108A (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00002A P-0108 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00010, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00003 P-0106 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00004 P-0104 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00005 P-0102A (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-SUMP-00006 P-0102 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00007 P-0109 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00008 P-0111 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00009 P-0112 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00010 P-0113 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00011 P-0114 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00012 P-0117 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00013 P-0117A (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00014, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
				-P1-P01T-00001, Rev 7
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00031 P-0119 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00010, Rev 3 -P1-P01T-00001, Rev 7
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00034 P-0121A (Spent Resin Dewatering, El. 0')	75	Dry Sump	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012, Rev 2
PWD-SUMP-00035 P-0122A (Waste Packaging Area, El. 0')	75	Dry Sump	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012, Rev 2
PWD-SUMP-00036 P-0118 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-P0012, Rev 2 -P1-P01T-00001, Rev 7
PWD-SUMP-00037 P-0124A	7.5		30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012, Rev 2
RLD-SUMP-00003	583	Dry Sump	78" x 48" x 36" Deep	**24590-PTF**

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
P-0150 (Radioactive Liquid Waste Disposal Area, El. 0', outdoor)			Epoxy coating	-M6-RLD-00002003, Rev 0
PVP-ZY-00037-S11B-03, P-0105 (PVP-BULGE-00001, El. 0')			3" Stainless Steel	**24590-PTF** -M6-PVP-00017002, Rev 0
PVP-ZY-00036-S11B-03, P-0101A (PVP-BULGE-00002, El. 0')			3" Stainless Steel	**24590-PTF** -M6-PVP-00018002, Rev 0
TCP-ZF-00032-S11B-03 Drain Line, P-0116 (TCP-BULGE-00004, El. 0')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-TCP-00001002, Rev 1
DIW-ZF-01511-S11B-03 Drain Line, P-0320 (DIW-BULGE-00001, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-DIW-00004001
DIW-ZF-01510-S11B-03, P-0320 Drain Line (DIW-BULGE-00002, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-DIW-00004001
PWD-FD-00005 PWD-ZF-03000-S11B-06 P-0123 (Hot Cell, El.0')	939	N/A	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00011, Rev 2
PWD-FD-00006 PWD-ZF-03001-S11B-06 P-0123 (Hot Cell, El.0')	939	N/A	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00011, Rev 2
PWD-FD-00435 P-0105		NA	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00349 P-0105		NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00436 P-0105		NA	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00438 P-0105A		NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00348 P-0105A		NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00437 P-0105B		NA	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-347 P-0105B		NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-346 P-0105C		NA	4" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00293 P-0426 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00298 P-0425 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00309 P-0402 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00310 P-0402 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00311 P-0402 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00312 P-0402 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00376 P-0415 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00377 P-0415 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00378 P-0415 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00379 P-0415 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00380 P-0415A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00381 P-0415A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00382 P-0415A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00383 P-0415A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00557 P-0430 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00559 P-0430 Drain, El. 77'	665	N/A	8" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00043, Rev 3
PWD-FD-00561 P-0430 Drain, El. 77'	140	N/A	6" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00043, Rev 3
PWD-FD-00563 P-0411 Drain, El. 77'	665	N/A	8" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00043, Rev 3
PWD-FD-00564 P-0411 Drain, El. 77'	140	N/A	6" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00043, Rev 3
PWD-FD-00565 P-0410 Drain, El. 77'	665	N/A	8" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00043, Rev 3
PWD-FD-00566 P-0410 Drain, El. 77'	665	N/A	8" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00043, Rev 3
PWD-FD-00571 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00044, Rev 3
PWD-FD-00572 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00044, Rev 3
PWD-FD-00573 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00044, Rev 3
PWD-FD-00574 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00044, Rev 3
PWD-FD-00575 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**<u>24590-PTF</u>** -M6-PWD-00044, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00576 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00583 P-0422A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00584 P-0422A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00589 P-0402 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00590 P-0423 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00591 P-0423 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00592 P-0423 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00593 P-0423 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00594 P-0423 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00595 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00596 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00597 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00598 P-0431A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00599 P-0431A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00600 P-0431A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00604 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00605 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00606 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00607 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00629 P-0425 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00630 P-0425 Drain, El. 77'	140	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
CRP-ZF-00002-S11B-03, P-0317 Drain Line (CRP-BULGE-00001 drain, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-CRP-00003001, Rev 0

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
CXP-ZF-00012-S11B-03 Drain Line, P-0317 (CXP-BULGE-00004, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-CXP-00003003, Rev 0
UFP-ZF-00043-S11B-03 Drain Line, P-0301 (UFP-BULGE-00001, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-UFP-00016001, Rev 0
UFP-ZF-00042-S11B-03 Drain Line, P-0301 (UFP-BULGE-00002, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-UFP-00017001, Rev 0
UFP-ZY-00002-S11B-03 Drain Line, P-0311 (UFP-BULGE-00005, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M56-UFP-00031001, Rev 0
UFP-ZY-00001-S11B-03 Drain Line, P-0311A (UFP-BULGE-00006, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-UFP-00032001, Rev 0
PWD-LDB-00001 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00002 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00003 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00004	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
P-B001 (Inter Facility Transfer Line Tunnel, El.-45')				
PWD-LDB-00005 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00006 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00007 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00008 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00009 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00010 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00011 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00012	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
P-B001 (Inter Facility Transfer Line Tunnel, El.-45')				
PWD-LDB-00013 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00014 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00015 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00016 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00017 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00018 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00019 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
RLD-LDB-00012 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 34" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00058, Rev 4

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
RLD-LDB-00013 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 34" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00058, Rev 4
ASX Sampler 00017 Lower Containment Trough/Dam (P-0311B, El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007, Rev 3
ASX Sampler 00019 Lower Containment Trough/Dam (P-0302, El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007, Rev 3
ASX Sampler 00020 Lower Containment Trough/Dam (P-0301, El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007, Rev 3
ASX Sampler 00025 Lower Containment Trough/Dam (P-0307, El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007, Rev 3

[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Note #1: These are special cases due to their location in equipment berms. The capacity for these drain lines is based on a unique bounding case for liquid spillage.

1 **Table III.10.E.K - LAW Vitrification Plant Tank Systems Primary[a] Containment Sump Systems**

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.E.K - LAW Vitrification Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.
[b] Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-SUMP-00028 L-B001B (C3/C5 Drains/Sump Collection Vessel Cell, El. –21')	59	Dry Sump	24" Dia. By 30" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00002005, Rev 0 -P1-P01T-00001, Rev 4
RLD-SUMP-00029 L-0123 (Process Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 1 -P1-P01T-00002, Rev 7
RLD-SUMP-00030 L-0123 (Process Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 1 -P1-P01T-00002, Rev 7
RLD-SUMP-00031 L-0124 Process Cell Sump, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 1 -P1-P01T-00002, Rev 7
RLD-SUMP-00032	37	Dry Sump	30" Dia. By 12" deep Stainless Steel	**24590-LAW** -M6-RLD-00003002, Rev 1

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
L-0124 (Process Cell, El. +3')			(6% Mo)	-P1-P01T-00002, Rev 7
RLD-SUMP-00035 L-0126 (Effluent Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003003, Rev 1 -P1-P01T-00002, Rev 7
RLD-SUMP-00036 L-0126 (Effluent Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003003, Rev 1 -P1-P01T-00002, Rev 7
Drain Line ID# = RLD-FD-00001 L-B001B (RLD-BULGE-00001 Drain, El. -21')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-RLD-00002003, Rev 0
Drain Line ID# = RLD-FD-00035 L-0126 (RLD-BULGE-0000-4 Drain El. +3')	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-RLD-00001005, Rev 0
Drain Line ID# = LOP-FD-00001 L-0123 (LOP-BULGE-00001 drain El. +3)	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-0001003, Rev 0
Drain Line ID# = LCP-FD-00001 L-0123 (LCP-BULGE-00001 Drain, El. +3')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00001001, Rev 0

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
Drain Line ID# = LCP-FD-00002 L-0123 (LCP-BULGE-00002 Drain, El. +3')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00001004, Rev 0 -M6-LCP-00001005, Rev 0
Drain Line ID# = RLD-WS-20037-S11B-01 L-0123 (Melter 1 Encasement Assembly Drain, El. +3')	N/A	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00012001, Rev 0
Drain Line ID# = LFP-FD-00001 L-0123 (LFP-BULGE-00001 Drain, El. +3)	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LFP-00001005, Rev 0
Drain Line ID# = LOP-FD-00002 L-0124 (LOP-BULGE-00002 Drain, El. +3)	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-00002003, Rev 0
Drain Line ID# = LCP-FD-00003 L-0124 (LCP-BULGE-00003 Drain, El. +3)	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00002001, Rev 0 -M6-LCP-00002002, Rev 0
Drain Line ID# = LFP-FD-00002 L-0124 (LFP-BULGE-00002 Drain, El. +3)	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LFP-00003005, Rev 0

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
Drain Line ID# = RLD-WS-20033-S11B-01 L-0124 (Melter 2 Encasement Assembly Drain, El. +3')	N/A	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00042001, Rev 0
LVP-FD-00001 L-0218 (Berm floor drain for LVP-TK-00001, El. 28')[b]	N/A	N/A	4" Dia. 316L	**24590-LAW** -M6-LVP-00002003, Rev 0
RLD-FD-00025 L-0304F (Curb floor drain for Caustic Scrubber, El. 48')[b]	N/A	N/A	4" Dia. 316L	**24590-LAW** -M6-RLD-00003001, Rev 0
ASX Sampler 00012 Lower Containment Trough/Dam (L-0301, El. 48')	N/A	N/A	3" Dia. Stainless Steel (316L)	**24590-LAW** -M6-RLD-00003001, Rev 0
ASX Sampler 00013 Lower Containment Trough/Dam (L-0301, El. 48')	N/A	N/A	3" Dia. Stainless Steel (316L)	**24590-LAW** -M6-RLD-00003001, Rev 0

[a] Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

[b] This sump is routinely accessible for inspections and maintenance.

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Table III.10.E.M - HLW Vitrification Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.
[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

1

Table III.10.E.N - HLW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
HCP-SUMP-00001 H-B014 (Wet Process Cell, El. –21')	75	Dry Sump	30" Dia. x 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0 -P1-P01T-00001, Rev 9
RLD-SUMP-00001 H-B014 (Wet Process Cell, El. –21')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0 -P1-P01T-00001, Rev 9
HOP-SUMP-00003 H-B021 (SBS Drain Collection Cell 1, El. –21')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0 -P1-P01T-00001, Rev 9
HOP-SUMP-00008 H-B005 (SBS Drain Collection Cell 2, El. -21')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-20004001, Rev 0 -P1-P01T-00001, Rev 9
HDH-SUMP-00001 H-B039B (Canister Rinse Tunnel, El. –16.5')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001, Rev 0 -P1-P01T-00001, Rev 9
HDH-SUMP-00002	75	Dry Sump	30" Dia. X 18" Deep	**24590-HLW**

Table III.10.E.N - HLW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
H-B039A (Canister Rinse Bogie Maintenance Room, El. –16')			Stainless Steel	-M6-RLD-00016001, Rev 0 -P1-P01T-00001, Rev 9
HDH-SUMP-00003 H-B035 (Canister Decon Cave, El. –16')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00004002, Rev 0 -P1-P01T-00001, Rev 9
HFP-SUMP-00002 H-0117 (Melter Cave 1, El. 5')	50	Dry Sump	20.5" X 20.5" X 16" Stainless Steel	**24590-HLW** -M6-RLD-00008002, Rev 0 -P1-P01T-00002, Rev 7
HFP-SUMP-00005 H-0106 (Melter Cave 2 El. 5')	50	Dry Sump	20.5" X 20.5" X 16" Stainless Steel	**24590-HLW** -M6-RLD- 20005, Rev 6 -P1-P01T-00002, Rev 7
HSH-SUMP-00003 H-0117 (Melter Cave 1, El. 3')	50	Dry Sump	20.5" X 20.5" X 16" Stainless Steel	**24590-HLW** -M6-RLD-00008002, Rev 0 -P1-P01T-00002, Rev 7
HSH-SUMP-00007 H-0106 (Melter Cave 2, El. 3')	50	Dry Sump	20.5" X 20.5" X 16" Stainless Steel	**24590-HLW** -M6-RLD-20005001, Rev 0 -P1-P01T-00002, Rev 7
HSH-SUMP-00008 H-310A (Melter 1 Equip. Decon. Pit Area, El. 0')	50	Dry Sump	30" X 24" X 16" Stainless Steel	**24590-HLW** -M6-RLD-00003001, Rev 0 -P1-P01T-00002, Rev 7
HSH-SUMP-00009 H-0304A (Melter 2 Equip. Decon. Pit Area, El. 0')	50	Dry Sump	30" X 24" X 16" Stainless Steel	**24590-HLW** -M6-RLD-20003001, Rev 0 -P1-P01T-00002, Rev 7

Table III.10.E.N - HLW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
HPH-SUMP-00001 H-0136 (Canister Handling Cave, El. -3')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001, Rev 0
HPH-SUMP-00005 H-0136 (Canister Handling Cave, El. -3')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00004001, Rev. 0
HPH-SUMP-00003 H-B032 (Pour Tunnel 1, El. -21')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001, Rev 0
RLD-ZF-03330-S11B-03 H-B021 (SBS Drain Collection Cell 1)	N/A	N/A	Line Size Pipe Dia 3" 316L Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0
RLD-ZF-03447-S11B-03 H-B005 (SBS Drain Collection Cell 2)	N/A	N/A	Line Size Pipe Dia 3" 316L Stainless Steel	**24590-HLW** -M6-RLD-20004001, Rev 0
RLD-FD-0186 H-0308 (Melter 1 - Active Services Cell, El. 37')	N/A	N/A	Line Size Pipe Dia 6" Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0
RLD-FD-0187 H-0302 (Melter 2 - Active Services Cell, El. 37')	N/A	N/A	Line Size Pipe Dia 6" Stainless Steel	**24590-HLW** -M6-RLD-20004001, Rev 0
ASX Sampler 00028 Lower Containment Trough/Dam (H-0305A, El. 37')	N/A	N/A	3" Dia. Stainless Steel	**24590-HLW** -M6-RLD-00002002, Rev 0
ASX Sampler 00029 Lower Containment Trough/Dam	N/A	N/A	3" Dia. Stainless Steel	**24590-HLW** -M6-RLD-00002002, Rev 0

Table III.10.E.N - HLW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
(H-0315, El. 37')				
ASX Sampler 00042 Lower Containment Trough/Dam (H-0318, El. 37')	N/A	N/A	3" Dia. Stainless Steel	<u>**24590-HLW**</u> -M6-RLD-00002002, Rev 0
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.E.O – Laboratory Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section <u>III.10.C</u>, and must comply with dangerous waste tank system requirements for tanks as described in <u>WAC-173-303-640</u>.

[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.E.P – Laboratory Tank Systems Secondary Containment Systems, ncluding Sumps, Leak Detection Boxes, and Floor Drains

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Type/Nominal Operating Volume (gallons)	Sump Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-SUMP-00041 A-B003 (C3 Effluent Vessel Cell, El. -18'7')	30	Dry	30" Dia. X ~13" Deep Stainless Steel	**24590-LAB** -M6-RLD-P0002, Rev 1 -P1-60-00007, Rev 3
RLD-SUMP-00042 A-B004 (C5 Effluent Vessel Cell, El. -19'2')	30	Dry	30" Dia. X ~13" Deep Stainless Steel	**24590-LAB** -M6-RLD-P0001, Rev 2 -P1-60-00007, Rev 3
RLD-SUMP-00045 A-B002 (C3 Pump Pit Sump, EL -6'-81/2"LP)	1.56	Dry	2'-0" X 2'-6" X 1/2"	**24590-LAB** -M6-RLD-P0002, Rev 1 -P1-60-00007, Rev 3
RLD-SUMP-00043A A-B007 (C5 Pump Pit Sump, EL -6'-7"LP)	1.40	Dry	1'-6" X 3'-0" X 1/2" Stainless Steel	**24590-LAB** -M6-RLD-P0001, Rev 2 -P1-60-00007, Rev 3
RLD-SUMP-00043B A-B005 (C5 Pump Pit Sump, EL -6'-7" LP)	1.40	Dry	1'-6" X 3'-0" X 1/2" Stainless Steel	**24590-LAB** -M6-RLD-P0001, Rev 2 -P1-60-00007, Rev 3
RLD-SUMP-00044 A-B006 (C5 Piping Pit Sump, EL -6'-7" LP)	1.56	Dry	2'-0" X 2'-6" X 1/2" Stainless Steel	**24590-LAB** -M6-RLD-P0001, Rev 2 -P1-60-00007, Rev 3
RLD-WU-02207-S11E-04 A-B003, (C3 Effluent Vessel Cell)	N/A	N/A	4" Dia 316L	**24590-LAB** -M6-RLD-P0002, Rev 1

Table III.10.E.P – Laboratory Tank Systems Secondary Containment Systems, ncluding Sumps, Leak Detection Boxes, and Floor Drains

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Type/Nominal Operating Volume (gallons)	Sump Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-ZN-02203-S11E-04 A-B004, (C5 Effluent Vessel Cell)	N/A	N/A	4" Dia 316L	**24590-LAB** -M6-RLD-P0001, Rev 2
RLD-ZN-03393-S11E-04 A-B004, (C5 Effluent Vessel Cell)	N/A	N/A	4" Dia 316L	**24590-LAB** -M6-RLD-P0001, Rev 2
RLD-ZN-03394-S11E-04 A-B004, (C5 Effluent Vessel Cell)	N/A	N/A	4" Dia 316L	**24590-LAB** -M6-RLD-P0001, Rev 2
RLD-LDB-00002 A-B004 (C5 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0008, Rev 1
RLD-LDB-00004 A-B004 (C5 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0008, Rev 1
RLD-LDB-00005 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0007, Rev 1
RLD-LDB-00006 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0007, Rev 1
RLD-LDB-00007 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0007, Rev 1
RLD-LDB-00008	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0007, Rev 1

Table III.10.E.P – Laboratory Tank Systems Secondary Containment Systems, ncluding Sumps, Leak Detection Boxes, and Floor Drains

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Type/Nominal Operating Volume (gallons)	Sump Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
A-B003 (C3 Effluent Vessel Cell, El. -10')				
RLD-LDB-00009 A-B004 (C5 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0008, Rev 1
RLD-LDB-00011 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-00007001, Rev 0
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

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III.10.F CONTAINMENT BUILDING UNITS

III.10.F.1 Containment Building Units and Storage Limits

III.10.F.1.a Approved Waste and Storage Limits

III.10.F.1.a.i The Permittees may store and treat, in containment building units listed in Permit Table III.10.F.A., as modified by Permit Condition III.10.F.7.d.iv., all dangerous and mixed waste listed in the Part A Forms, Operating Unit Group 10, Addendum A of this Permit, except for those wastes outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B, as approved pursuant to Permit Condition III.10.C.3. Total dangerous and mixed waste storage at the containment building units will not exceed the sum of the capacities in column 7 of Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv.

III.10.F.1.a.ii The Permittees may place and store dangerous and mixed waste only in the containment building units listed in Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv., in accordance with Permit Condition III.10.F., and in accordance with Operating Unit Group 10, Chapters 1.0 and 4.0, and Operating Unit Group 10, Appendices 8.1, 8.2, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18 of this Permit, as approved pursuant to Permit Conditions III.10.F.7.c. and III.10.F.7.d. The Permittees will limit the volume of dangerous and mixed waste to quantities specified for the individual areas listed in column 7 of Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv.

III.10.F.1.b The Permittees will manage any ignitable, reactive, or incompatible waste in these units in accordance with WAC 173-303-395(1). Any containment building units specified in Permit Table III.10.F.A. in which ignitable, reactive, or incompatible waste are managed will meet the requirements specified in WAC 173-303-640(9) and (10), in accordance with WAC 173-303-680(2).

III.10.F.1.c The Permittees must maintain documentation in the operating record of the description and quantity of dangerous waste in each containment building unit listed in Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv., in accordance with WAC 173-303-380.

III.10.F.1.d The Permittees will ensure all certifications required by specialists (e.g., qualified, registered, professional engineer, etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10.:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new containment building unit or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., design engineer, etc.), for the following containment building unit components (e.g., the venting piping, etc.), as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely, 40 CFR 264.1101(c)(2) in accordance with WAC 173-303-695).

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

III.10.F.2 Containment Building Unit Design and Construction

III.10.F.2.a The Permittees will design and construct the containment building units identified in Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv., as specified in Operating Unit Group 10, Appendices 8.1, 8.2, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18 of this Permit, as approved in accordance with Permit Condition III.10.F.7.a. and WAC 173-303-695.

III.10.F.2.b The Permittees will design and construct all applicable containment building units' secondary containment systems for each unit listed in Permit Table III.10.F.A., as specified in Operating Unit Group 10, Appendices 8.4 through 8.9, 8.15, 9.4 through 9.9, 9.18, 10.4 through 10.9, and 10.18 of this Permit, as approved in accordance with Permit Condition III.10.F.7.a. and WAC 173-303-695.

III.10.F.2.c Modifications to approved design plans and specifications, in Operating Unit Group 10, Appendices 8.1, 8.2, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18 of this permit, for the containment building units will be allowed only in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g., III.10.C.9.d, and III.10.C.9.e.

III.10.F.3 Containment Building Unit Management Practices

III.10.F.3.a The Permittees will manage all dangerous and mixed waste in containment building units in accordance with procedures described in Operating Unit Group 10, Appendices 8.15, 9.18, 10.18 and Addendum C of this Permit, as approved pursuant to Permit Condition III.10.F.7.d.iv.

III.10.F.3.b The Permittees will follow the description of operating procedures described in Operating Unit Group 10, Appendices 8.15, 9.18, 10.18 and Addendum C, of this permit, as approved pursuant to Permit Condition III.10.F.7.d.iv. and Permit Condition III.10.F.3., and as specified below:

III.10.F.3.b.i Maintain the primary barrier to be free of significant cracks, gaps, corrosion, or other deterioration that could cause dangerous and mixed waste to be released from the primary barrier;

III.10.F.3.b.ii Maintain the level of stored/treated dangerous and mixed waste within the containment building unit walls so that the height of the wall is not exceeded;

III.10.F.3.b.iii Take measures to prevent the tracking of dangerous and mixed waste out of the unit by personnel or by equipment used in handling the waste. An area must be designated to decontaminate equipment and any rinsate must be collected and properly managed;

III.10.F.3.b.iv Maintain the containment building unit at all times to prevent the spread of airborne dangerous and/or mixed waste contamination into less contaminated or uncontaminated areas. All air pollution control devices for exhaust from containment building unit must be properly maintained and operational when storing or treating dangerous and mixed waste in the containment building units;

III.10.F.3.b.v Collect and remove liquids and waste to minimize hydraulic head on the containment system at the earliest practicable time.

III.10.F.3.c The Permittees will inspect the containment building units per requirements in the Operating Unit Group 10, Addendum E1 of this permit, as approved pursuant to Permit Condition III.10.C.5., 40 CFR 264.1101(c)(4),in accordance with WAC 173-303-695 and WAC 173-303-320 and record in the Facility's operating record, at least once every seven (7) days, data gathered from monitoring equipment and leak detection equipment as well as the containment building unit and area immediately surrounding the containment building unit to detect signs of releases of dangerous and mixed waste.

III.10.F.3.d Throughout the active life of the containment building unit, if the Permittees detects a condition that could lead to or has caused a release of dangerous and/or mixed waste, the Permittees must repair the condition promptly, in accordance with the following procedures:

III.10.F.3.d.i Upon detection of a condition that has led to the release of dangerous and/or mixed waste (e.g., upon detection of leakage from the primary barrier) the Permittees must:

A. Enter a record of the discovery in the facility operating record;

B. Immediately remove the portion of the containment building unit affected by the condition from service;

C. Determine what steps must be taken to repair the containment building unit, remove any leakage from the secondary collection system, and establish a schedule for accomplishing the cleanup and repairs; and

D. Within seven (7) days after the discovery of the condition, notify Ecology of the condition, and within fourteen (14) working days, provide a written notice to Ecology with a description of the steps taken to repair the containment building unit, and the schedule for accomplishing the work.

III.10.F.3.d.ii Ecology will review the information submitted, make a determination regarding whether the containment building unit must be removed from service completely or partially until repairs and cleanup are complete, and notify the Permittees of the determination and underlying rationale in writing.

III.10.F.3.d.iii Upon completing all repairs and cleanup the Permittees must notify Ecology in writing and provide verification, signed by a qualified, registered, professional engineer, that repairs have been completed according to the written notice submitted in accordance with Permit Condition III.10.F.3.d.i.D.

III.10.F.4 Inspections [WAC 173-303-640(6)]

III.10.F.4.a The Permittees will inspect the containment building units in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E of this Permit, as modified pursuant to Permit Condition III.10.C.5.c.

III.10.F.4.b The inspection data for the containment building units will be recorded, and the records will be placed in the WTP Unit operating record, in accordance with Permit Condition III.10.C.4.

III.10.F.5 Recordkeeping (WAC 173-303-380)

For the containment building units, the Permittees will record and maintain in the WTP Unit operating record, all monitoring, calibration, recording, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4. and III.10.C.5.

III.10.F.6 **Closure**

The Permittees will close the containment building units in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.F.7 **Compliance Schedule**

III.10.F.7.a All information identified for submittal to Ecology in Permit Conditions III.10.F.7.b. through e. of this compliance schedule must be signed in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.F.1.d. [WAC 173-303-806(4)].

III.10.F.7.b Prior to initial receipt of dangerous and/or mixed waste, the Permittees will submit to Ecology a certification by a qualified, registered, professional engineer that the containment building units design meets the requirements of Permit Conditions III.10.F.1.and III.10.F.2. in accordance with Permit Condition III.10.F.7.a. The certification will also be stored in the WTP Unit operating record. For containment buildings units in Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv., identified as allowed to manage free liquids, the certification will include an additional demonstration that the containment building meets the requirements specified in 40 CFR 264.1101(b), in accordance with WAC 173-303-695.

III.10.F.7.c The Permittees submit to Ecology pursuant to Permit Condition III.10.C.9.f., prior to construction of the containment building unit containment system, and as appropriate, leak detection system for each containment building unit (per level, per WTP Unit building) as identified in Permit Condition III.10.F.1., Permit Tables III.10.F.A., engineering information as specified below, for incorporation, as appropriate, into Operating Unit Group 10, Appendices 8.1, 8.2, 8.3, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18 of this Permit. At a minimum, engineering information specified below will show the following as required in accordance with WAC 173-303-695 (the information specified below will include dimensioned engineering drawings showing floors, walls, and ceilings/roof of the containment building units and other information on floor drains and sumps):

III.10.F.7.c.i Design drawings (General Arrangement Drawings in plan) and specifications for the foundation, containment, including liner/coating installation details and leak detection methodology, as appropriate [40 CFR 264.1101(a)(1) and (b), in accordance with WAC 173-303-695].

III.10.F.7.c.ii The Permittees provide the design criteria (references to codes and standards, load definitions and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the containment system. This information demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [40 CFR 264.1101(a)(2) in accordance with WAC 173-303-695, in accordance with WAC 173-303-695].

III.10.F.7.c.iii The Permittees provide documentation addressing how coatings will withstand the movement of personnel, waste, and equipment during the operating life of the containment building per 40 CFR 264.1101(a)(2), (a)(4), and (b) in accordance with WAC 173-303-695.

III.10.F.7.c.iv Containment/foundation and, as appropriate, for leak detection systems, materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials as applicable [e.g. physical and chemical tolerances]) [40 CFR 264.1101(a)(4) and (b) in accordance with WAC 173-303-695].

III.10.F.7.c.v A detailed description of how the containment/foundation and, as appropriate, leak detection systems, will be installed.

III.10.F.7.c.vi Submit Permit Tables III.10.F.B and III.10.F.C, completed to provide for all secondary containment sumps and floor drains, the information as specified in each column heading, consistent with the information to be provided in i. through viii.

III.10.F.7.c.vii A detailed description of how fugitive emissions will be controlled such that any openings (e.g., doors, windows, vents, cracks, etc.) exhibit no visible emissions [40 CFR 264.1101(c)(1)(iv) in accordance with WAC 173-303-695].

III.10.F.7.c.viii Prior to installation, the Permittees will submit coating vendor information specific to containment buildings for incorporation into the Administrative Record [40 CFR 264.1101(a)(4) and (b) in accordance with WAC 173-303-695].

III.10.F.7.c.ix Prior to installation, leak detection system documentation (e.g. vendor information, etc.) consistent with information submitted under i. above, will be submitted for incorporation into the Administrative Record;

III.10.F.7.c.x Prior to installation, the Permittees will submit leak detection system instrumentation control logic narrative description (e.g., descriptions of fail-safe conditions, etc.);

III.10.F.7.c.xi Prior to installation, system descriptions related to leak detection systems will be submitted for incorporation into the Administrative Record;

III.10.F.7.c.xii For leak detection system instrumentation for containment buildings as identified in Permit Tables III.10.F.D., a detailed description of how the leak detection system instrumentation will be installed and tested [40 CFR 264.1101(b)(3) in accordance with WAC 173-303-695] will be submitted prior to installation.

Information pertaining to leak detection systems in Permit Conditions III.10.F.7.c.ix. through xii. Will be submitted pursuant to Permit Conditions III.10.E.9.d.vii., viii., x., and xiii.

III.10.F.7.d Prior to initial receipt of dangerous and mixed waste, in the WTP Unit, the Permittees will submit the following, as specified below, for incorporation into Operating Unit Group 10. The information specified below into Operating Unit Group 10, and incorporated pursuant to Permit Condition III.10.C.2.g. will be followed:

III.10.F.7.d.i Registered Professional Engineer certification documentation consistent with the information provided in III.10.F.7.b. and III.10.F.7.c. for incorporation in the Administrative Record. The certification must be maintained in the WTP Unit Operating Record [40 CFR 264.1101(c)(2)];

III.10.F.7.d.ii Updated Addendum C, Section 4.2.1., and the figures for containment building units identified in Permit Table III.10.F.A. (as modified pursuant to Permit Condition III.10.F.7.d.iv., consistent with Operating Unit Group 10, Appendices 8.1, 8.2, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18, as approved pursuant Permit Conditions III.10.F.7.a. through d.);

III.10.F.7.d.iii Description of operating procedures demonstrating compliance with 40 CFR 264.1101(c) and (d) in accordance with WAC 173-303-695;

III.10.F.7.d.iv III. Permit Table III.10.F.A., amended as follows:

A. Under column 1, update and complete list of dangerous and mixed waste containment building units including room location and number.

B. Under column 2, update unit dimensions.

C. Under column 3, replace the 'Reserved' with the Operating Unit Group 10, Appendices 8.0, 9.0, and 10.0, subsections specific to containment building units as listed in column 1.

D. Under column 4, update and complete list of narrative description, tables, and figures.

E. Under column 5, replace the 'Reserved' to indicate if container storage is used in each containment building units (Yes or No) consistent with Permit Table III.10.D.A. updated pursuant to Permit Condition III.10.D.10.d.

F. Under column 6, replace the 'Reserved' to indicate if tank storage is used in each containment building units (Yes or No) consistent with Permit Tables III. 10.E.A-D., updated pursuant to Permit Condition III.10.E.9.e.vi.

G. Under column 7, replace the 'Reserved' with the maximum operating volume for each containment building unit, to include the container storage capacity specified in Permit Table III.10.D.A., tank capacity specified in Permit Tables III. 10.E.A-D. and update the total capacity for the containment building units.

H. Under column 8, update the status of each containment building unit.

III.10.F.7.d.v Permit Table III.10.F.D. will be completed for Containment Building leak detection system instrumentation and parameters to provide the information as specified in each column heading. Leak detection system monitors and instruments for critical systems as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b. will be addressed.

III.10.F.7.e All information provided under Permit Condition III.10.F.7.d. must be consistent with information provided pursuant to Permit Conditions III.10.F.7.a. through d., as approved by Ecology.

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
Pretreatment Plant							
P-0123 Pretreatment Hot Cell Containment Building	350x51x52	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
Pretreatment Maintenance Containment Building							
PM0124 Hot Cell Crane Maintenance Mezzanine	27 x 51 x 33	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0121A Spent Resin Dewatering	28 × 18 × 28	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0122A Waste Packaging Area	26 × 51 × 28	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0123A Remote Decontamination Maintenance Cell	55 × 51 × 52	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0124 C3 Workshop	(24 × 24 × 16) + (34 x 24 x 15)	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
P-0124A C3 Workshop	(73 + 15 × 15) + (16 × 15 + 15)	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0125 Cask Lidding Airlock & Equipment Chase	24 × 20 × 28	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0125ACask Lidding Room	28 × 18 × 25	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0128A MSM Repair Area	24 × 18 × 28	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0128 MSM Testing Room	24 × 17 × 27	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0223 Spent Filter Drum Handling Area Containment Building	54 x 18 x 26	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0335 Filter Cave Containment Building	198 x 51 x 52	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
P-0431A General Filter Rm	RESERVED	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
LAW Vitrification Plant							
L-0112 LAW LSM Gallery Containment Building	150x62x24	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	Yes
ILAW Container Finishing Containment Building		RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
L-0109B Swabbing Area Line 2	21×15×24	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0109C Decontamination Area Line 2	18×15×24	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0109D Inert Fill Area Line 2	55×15×24	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0115B Swabbing Area Line 1	21×15×24	RESERVED	Section 4.2.4; Table C-7; and	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
			Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.				
L-0115C Decontamination Area Line 1	18×15×24	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0115D Inert Fill Area Line 1	55×15×24	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0109E Container/Monitoring/Export Area	19×18×14	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0115E Container/Monitoring/Export Area	19×18×14	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0119B LAW Consumable Import/Export Containment Building	30x28x17	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	Yes
L-226A LAW C3 Workshop Containment Building	34x22x19	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
LAW Pour Cave Containment Building		RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B015A Melter 1 Pour Cave	16.5×20x23	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B013C Melter 1 Pour Cave	16.5×20x23	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B013B Melter 2 Pour Cave	16.5×20x23	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B011C Melter 2 Pour Cave	16.5×20x23	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B011B Future Melter 3 Pour Cave	16.5×20x23	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B009B Future Melter 3 Pour Cave	16.5×20x23	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
LAW Buffer Container Containment Building		RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B025C Container Buffer Store	22x22x23	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B025D Container Rework	22x14x23	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
HLW Vitrification Plant							
HLW Melter Cave 1 Containment Building: H-0117 Melter Cave 1 H-0116B Melter Cave 1 C3/C5 Airlock H-0310A Melter Cave 1 Equipment Decon Pit	 75 x 32 x 54 24 x 25 x 54 20 x 9 x 10	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
HLW Melter Cave 2 Containment Building: H-0106 Melter Cave 2 H-0105B Melter Cave 2 C3/C5 Airlock H-0304A Melter Cave 2 Equipment Decon Pit	 75 x 32 x 54 24 x 25 x 54 20 x 9 x 10	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
H-0136 IHLW Canister Handling Cave Containment Building	18 x 140 x 54	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
H-0133 IHLW Canister Swab and Monitoring Cave Containment Building	41 x 11 x 54	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
HLW C3 Workshop Containment Building: H-0311A C3 Workshop H-0311B MSM Maintenance Workshop	 19 x 30 x 22 58 x 69 x 22	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
H-0104 HLW Filter Cave Containment Building	105 x 36 x 36	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
H-B032 HLW Pour Tunnel 1 Containment Building	85 x 11 x 30	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
H-B005A HLW Pour Tunnel2 Containment Building	85 x 11 x 30	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
HLW Waste Handling Area Containment Building:		RESERVED	Section 4.2.4; Table C-7; and	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
H-0410B E&I Room H-0411 Waste Handling Room	17 x 20 x 10 25 x 54 x 10		Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.				
HLW Drum Swabbing and Monitoring Area: H-0126A Crane Maintenance Room H-0126B Swabbing and Monitoring Room H-028 Cask Import/Export Room	 15 x 20 x 31 30 x 18 x 31 15 x 45 x 43	RESERVED	Section 4.2.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

[a]Containment Building Units include associated process systems and equipment

[b]Requirements pertaining to the containers in the Containment Building Units are specified in Section III.10.D. of this Permit.

[c]Requirements pertaining to the tanks in the Containment Building Units are specified in Section III.10.E. of this Permit.

Table III.10.F.B – Containment Building Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Capacity (gallons)	Dimensions[b] (feet) & Materials of Construction	Maximum Allowable Liquid Height (inches)	Secondary Containment Volume (gallons)	Unit Description Drawings
PWD-SUMP-00026 P-0123 (El. 0')	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00028 P-0123 (El. 0')	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00029 P-0123 (El. 0')	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00032 P-0123A	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00033 P-0123A (El. 0')	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.
[b] Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.F.C – Containment Building Secondary Containment Systems Including Sumps and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications No.'s, etc.)
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a] Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.F.D – Containment Building Leak Detection System Instrumentation and Parameters

Containment Building Locator and Name (including P&ID)	Type of Leak Detection Instrument	Location of Leak Detection Instrument (Tag No.)	Leak Detection Instrument Range	Expected Range	Fail States	Leak Detection Instrument Accuracy	Leak Detection Instrument Calibration Method No. and Range
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Locator (including P&ID designator) is located on Permit Table III.10.F.C – Containment Building Secondary Containment Systems Including Sumps and Floor Drains.

III.10.G PRETREATMENT PLANT MISCELLANEOUS UNIT SYSTEMS

Unless otherwise noted in Table III.10.G.A, for purposes of Permit Section III.10.G., where reference is made to WAC 173-303-640, the following substitutions apply: substitute the terms "Pretreatment Plant Miscellaneous Unit System(s)" for "tank system(s)," "miscellaneous unit(s)" for "tank(s)," "equipment" for "ancillary equipment," and "miscellaneous unit(s) or equipment of a Pretreatment Plant Miscellaneous Unit System" for "component(s)" in accordance with WAC 173-303-680. Miscellaneous unit systems, exempt from the WAC-173-303-640 requirements in Permit Section III.10.G are noted as exempt in Table III.10.G.A.

III.10.G.1 Waste and Storage Limits

III.10.G.1.a The Permittees may process, in the Pretreatment Plant Miscellaneous Unit Systems listed in Permit Table III.10.G.A, as approved/modified pursuant to Permit Condition III.10.G.10, all dangerous and mixed waste listed in the Part A Forms, Operating Unit Group 10, Addendum A of this Permit, and in accordance with in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3. Total Pretreatment Plant Miscellaneous Unit dangerous and mixed waste storage at the Facility will not exceed the limits specified in Permit Table III.10.G.A.

III.10.G.1.b The Permittees may process dangerous and mixed waste only in approved Pretreatment Plant Miscellaneous Unit Systems listed in Permit Table III.10.G.A in accordance with Permit Section III.10.G and in accordance with Operating Unit Group 10, Chapters 1.0 and 4.0 of this Permit, and Operating Unit Group 10, Appendices 8.1 through 8.15 of this Permit, as approved pursuant to Permit Conditions III.10.G.10.b. through e. The Permittees will limit the total volume of wastes to quantities specified for the individual miscellaneous units listed in Permit Table III.10.G.A.

III.10.G.1.c The Permittees will manage ignitable and reactive, and incompatible waste in accordance with WAC 173-303-395(1). Any Pretreatment Plant Miscellaneous Unit System specified in Permit Tables III.10.G.A and III.10.G.B in which ignitable, reactive or incompatible waste are managed will meet the requirements specified in WAC 173-303-640(9) and (10), in accordance to WAC 173-303-680.

III.10.G.1.d The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer; independent corrosion expert; independent, qualified installation inspector; etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new miscellaneous unit system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following miscellaneous unit system components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)) in accordance with WAC 173-303-680).

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

III.10.G.1.e In all future narrative permit submittals, the Permittees will include miscellaneous unit system names with the unit designation (e.g., Waste Feed Evaporator Separator Vessels are designated V11002A and V11002B, respectively).

III.10.G.2 Miscellaneous Unit Systems Design and Construction [WAC 173-303-640, in accordance with WAC 173-303-680(2) and WAC 173-303-340].

III.10.G.2.a The Permittees will construct the Pretreatment Plant Miscellaneous Unit Systems identified in Permit Table III.10.G.A, as specified in Operating Unit Group 10, Appendices 8.1 through 8.14 of this Permit, as approved pursuant to Permit Conditions III.10.G.10.b., III.10.G.10.c., and III.10.G.10.d.

III.10.G.2.b The Permittees will construct secondary containment systems for the Pretreatment Plant Miscellaneous Unit Systems identified in Permit Tables III.10.G.A and III.10.G.B, as specified in Operating Unit Group 10, Appendices 8.2, 8.4 through 8.14 of this Permit, as approved pursuant to Permit Conditions III.10.G.10.b., III.10.G.10.c., and III.10.G.10.d.

III.10.G.2.c Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the Pretreatment Plant Miscellaneous Unit Systems will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., e., and h.

III.10.G.3 Miscellaneous Unit System Installation and Certification [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-340].

III.10.G.3.a The Permittees must ensure that proper handling procedures are adhered to in order to prevent damage to Pretreatment Plant Miscellaneous Unit Systems during installation. Prior to covering, enclosing, or placing a new Pretreatment Plant Miscellaneous Unit System(s) or component(s) in use, an independent, qualified, installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of similar systems or components, must inspect the system for the presence of any of the following items:

III.10.G.3.a.i Weld breaks;

III.10.G.3.a.ii Punctures;

III.10.G.3.a.iii Scrapes of protective coatings;

III.10.G.3.a.iv Cracks;

III.10.G.3.a.v Corrosion;

III.10.G.3.a.vi Other structural damage or inadequate construction/installation;

III.10.G.3.a.vii All discrepancies must be remedied before the Pretreatment Plant Miscellaneous Unit Systems are covered, enclosed, or placed in use [WAC 173-303-640(3)(c) in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.b For Pretreatment Plant Miscellaneous Unit Systems or components that are placed underground and that are back-filled, the Permittees must provide a backfill material that is a non-corrosive, porous, homogeneous substance. The backfill must be installed so that it is placed completely around the miscellaneous unit and compacted to ensure that the miscellaneous unit and piping are fully and uniformly supported [WAC 173-303-640(3)(d), in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.c The Permittees must test for tightness all new Pretreatment Plant miscellaneous units and equipment, prior to being covered, enclosed, or placed into use. If the Pretreatment Plant Miscellaneous Unit Systems are found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the Pretreatment Plant Miscellaneous Units Systems being covered, enclosed, or placed in use [WAC 173-303-640(3)(e), in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.d The Permittees must ensure Pretreatment Plant Miscellaneous Unit Systems equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction [WAC 173-303-640(3)(f), in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.e The Permittees must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided in Operating Unit Group 10, Appendices 8.9 and 8.11 as approved pursuant to Permit Conditions III.10.G.10.b.i., III.10.G.10.b.iv., III.10.G.10.b.v., III.10.G.10.c.i., III.10.G.10.c.iv., III.10.G.10.c.v., and III.10.G.10.d.i., III.10.G.10.d.iv. III.10.G.10.d.v., or other corrosion protection if Ecology believes other corrosion protection is necessary to ensure the integrity of the Pretreatment Plant Miscellaneous Unit Systems during use of the Pretreatment Plant Miscellaneous Unit Systems. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation [WAC 173-303-640(3)(g), in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.f Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will obtain, and keep on file in the WTP Unit operating record, written statements by those persons required to certify the design of the Pretreatment Plant Miscellaneous Unit Systems and supervise the installation of the Pretreatment Plant Miscellaneous Unit Systems, as specified in WAC 173-303-640(3)(b), (c), (d), (e), (f), and (g), in accordance with WAC 173-303-680, attesting that each Pretreatment Plant Miscellaneous Unit System and corresponding containment system listed in Permit Tables III.10.G.A and III.10.G.B, as approved/modified pursuant to Permit Condition III.10.G.10., were properly designed and installed, and that repairs, in accordance with WAC 173-303-640(3)(c) and (e), were performed [WAC 173-303-640(3)(a), WAC 173-303-640(3)(h), in accordance with WAC 173-303-680(3)].

III.10.G.3.g The independent Pretreatment Plant Miscellaneous Unit System installation inspection and subsequent written statements will be certified in accordance with WAC 173-303-810(13)(a) as modified pursuant to Permit Condition III.10.G.1.d., comply with all requirements of WAC 173-303-640(3)(h), in accordance with WAC 173-303-680, and will consider, but not be limited to, the following miscellaneous unit system installation documentation:

III.10.G.3.g.i Field installation report with date of installation;

III.10.G.3.g.ii Approved welding procedures;

III.10.G.3.g.iii Welder qualifications and certification;

III.10.G.3.g.iv Hydro-test reports, as applicable, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Division 1, American Petroleum Institute (API) Standard 620, or Standard 650 as applicable;

III.10.G.3.g.v Tester credentials;

III.10.G.3.g.vi Field inspector credentials;

III.10.G.3.g.vii Field inspector reports;

III.10.G.3.g.viii Field waiver reports; and

III.10.G.3.g.ix Non-compliance reports and corrective action (including field waiver reports) and repair reports.

III.10.G.4 Integrity Assessments [WAC 173-303-340 and WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3)].

III.10.G.4.a The Permittees will ensure periodic integrity assessments are conducted on the Pretreatment Plant Miscellaneous Unit Systems listed in Permit Table III.10.G.A, as approved/modified pursuant to Permit Condition III.10.G.10., over the term of this Permit in accordance with WAC173-303-680(2) and (3) as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.G.10.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.G.4.b The Permittees will address problems detected during Pretreatment Plant Miscellaneous Unit Systems integrity assessments specified in Permit Condition III.10.G.4.a. following the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.G.10.e.i. and III.10.C.5.c.

III.10.G.4.c The Permittees must immediately and safely remove from service any Pretreatment Plant Miscellaneous Unit System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Condition III.10.G.5.j.i. through iv., and vi. The affected Pretreatment Plant Miscellaneous Unit or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.G.5.j.v. [WAC 173-303-640(7)(e) and (f) and WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.G.5 Miscellaneous Unit Management Practices

III.10.G.5.a No dangerous and/or mixed waste will be managed in the Pretreatment Plant Miscellaneous Unit Systems unless the operating conditions, specified under Permit Condition III.10.G.5, are complied with.

III.10.G.5.b The Permittees will install and test all process and leak detection system monitoring/instrumentation, as specified in Permit Table III.10.G.C, as approved/modified pursuant to Permit Condition III.10.G.10, in accordance with Operating Unit Group 10, Appendices 8.1, 8.2, and 8.14 of this Permit, as approved pursuant to Permit Condition III.10.G.10.d.x.

III.10.G.5.c The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the Pretreatment Plant Miscellaneous Unit Systems if these substances could cause the systems to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)].

III.10.G.5.d The Permittees will operate the Pretreatment Plant Miscellaneous Unit Systems to prevent spills and overflows using the description of controls and practices, as required under WAC 173-303-640(5)(b), described in Permit Condition III.10.C.5, and Operating Unit Group 10, Appendix 8.15 of this Permit, as approved pursuant to Permit Condition

III.10.G.10.e.iv. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3) and WAC 173-303-806(4)(c)(ix)].

III.10.G.5.e For routinely non-accessible Pretreatment Plant Miscellaneous Unit Systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.G.10.e.vi., the Permittees will mark all routinely non-accessible Pretreatment Plant Miscellaneous Unit System access points with labels or signs to identify the waste contained in the units. The label, or sign, must be legible at a distance of at least fifty (50) feet and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the miscellaneous unit system(s). For the purposes of this Permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.G.5.f For all Pretreatment Plant Miscellaneous Unit Systems not addressed in Permit Condition III.10.G.5.e, the Permittees will mark all these miscellaneous unit systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the unit. The labels, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the miscellaneous unit system(s) [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.G.5.g. The Permittees will ensure that the secondary containment systems for Pretreatment Plant Miscellaneous Unit Systems listed in Permit Tables III.10.G.A and III.10.G.B, as approved/modified pursuant to Permit Condition III.10.G.10, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, ground water, or surface water at any time waste is in the Pretreatment Plant Miscellaneous Units System. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 8.15 of this Permit, as approved pursuant to Permit Condition III.10.G.10.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303–640(4)(e)(i)(C), and WAC 173-303-640(6) in accordance with WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.G.5.i. An impermeable coating, as specified in Operating Unit Group 10, Appendices 8.4, 8.5,8.7, 8.9, 8.11, and 8.12 of this Permit, as approved pursuant to Permit Condition III.10.G.10.b.v. of this Permit, will be maintained for all concrete containment systems and concrete portions of containment systems for each Pretreatment Plant Miscellaneous Unit System listed in Permit Tables III.10.G.A and III.10.G.B, as approved/modified pursuant to Permit Condition III.10.G.10 [concrete containment systems that do not have a liner pursuant to WAC-173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2)]. The coating will prevent migration of any dangerous and mixed waste into the concrete. All coatings will meet the following performance standards:

III.10.G.5.i.i. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present;

III.10.G.5.i.ii. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and mixed waste could migrate from the system; and

III.10.G.5.i.iii. The coating must be compatible with the dangerous and mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3) and WAC 173-303-806(4)(i)(i)(A)].

III.10.G.5.j. The Permittees will inspect all secondary containment systems for the Pretreatment Plant Miscellaneous Unit Systems listed in Permit Tables III.10.G.A and III.10.G.B., as approved/modified pursuant to Permit Condition III.10.G.10., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.G.10.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c) and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)]:

III.10.G.5.j.i. Immediately and safely stop the flow of dangerous and/or mixed waste into the miscellaneous unit system or secondary containment system;

III.10.G.5.j.ii. Determine the source of the dangerous and/or mixed waste;

III.10.G.5.j.iii. Remove the waste from the containment area in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(b). The dangerous and/or mixed waste removed from containment areas of miscellaneous unit systems will be, as a minimum, managed as dangerous and/or mixed waste;

III.10.G.5.j.iv. If the cause of the release was a spill that has not damaged the integrity of the miscellaneous unit system, the Permittees may return the miscellaneous unit system to service in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(e)(ii). In such a case, the Permittees will take action to ensure the incident that caused liquid to enter the containment system will not reoccur [WAC 173-303-320(3)];

III.10.G.5.j.v. If the source of the dangerous and/or mixed waste is determined to be a leak from the primary Pretreatment Plant Miscellaneous Unit System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees must comply with the requirements of WAC 173-303-640(7), and take the following actions:

A Close the miscellaneous unit following procedures in WAC 173-303-640(7)(e)(i) and in accordance with WAC 173-303-680, and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8; or

B. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.G.1.d.) the Pretreatment Plant Miscellaneous Unit System in accordance with Operating Unit Group 10, Appendix 8.15 of this Permit, as approved pursuant to Permit Condition III.10.G.10.e.v. before the Pretreatment Plant Miscellaneous Unit System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

III.10.G.5.j.vi. The Permittees will document, in the operating record, actions/procedures taken to comply with i. through v. above, as specified in WAC 173-303-640(6)(d) and in accordance with WAC 173-303-680(2) and (3).

III.10.G.5.j.vii. In accordance with WAC 173-303-680(2) and (3), the Permittees will notify and report releases to the environment to Ecology as specified in WAC 173-303-640(7)(d).

III.10.G.5.k. If liquids (e.g., Dangerous and/or mixed waste leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A., B., and C. listed below. The Permittees will provide Ecology with a written demonstration, within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal.

B. Measures implemented to ensure continued protection of human health and the environment.

C. Current actions being taken to remove liquids from secondary containment.

III.10.G.5.l. The Permittees will operate the Pretreatment Plant Miscellaneous Unit Systems in accordance with Operating Unit Group 10, Addendum C as updated pursuant to Permit Condition III.10.G.10.e.vi. and Appendix 8.15 of this Permit, as approved pursuant to Permit Condition III.10.G.10.e., and the following:

III.10.G.5.l.i. The Permittees will operate the Pretreatment Plant Miscellaneous Unit Systems in order to maintain the systems and process parameters listed in Permit Table III.10.G.C. as approved/modified pursuant to Permit Condition III. 10.G.10., within the operating trips and operating ranges specified in Permit Table III.10.G.C., and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1, as approved pursuant to Permit Condition III.10.C.11.b. [WAC 173-303-815(2)(b)(ii) and WAC 173-303-680(2) and (3)]. For the purposes of this Permit Condition, Operating Unit Group 10, Appendix 6.3.1. will be superseded by Appendix 6.4.1. upon its approval pursuant to either Permit Conditions III.10.C.11.c. or III.10.C.11.d.

III.10.G.5.l.ii. The Permittees will calibrate/function test the instruments listed in Permit Table III.10.G.C., in accordance with Operating Unit Group 10, Appendix 8.15, as approved pursuant to Permit Condition III.10.G.10.e.xii.

III.10.G.5.m. For any portion of the Pretreatment Plant Miscellaneous Unit Systems which have the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.G.5.n. For each miscellaneous unit holding dangerous waste which are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes, or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e), in accordance with WAC 173-303-680].

III.10.G.6 Air Emissions

III.10.G.6.a Treatment effectiveness, feed-rates, and operating rates for dangerous and mixed waste systems and sub-systems contained in the Pretreatment Plant (as specified in Permit Tables III.10.E.A, III.10.F.A, and III.10.G.A, as approved/modified pursuant to Permit Conditions III.10.E.9., III.10.F.5., III.10.G.10., respectively) will be as specified in Permit Sections III.10.E, III.10.F, and III.10.G, and consistent with the assumptions and basis reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1, upon its approval, pursuant to either Permit Condition III.10.C.11.c. or III.10.C.11.d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

III.10.G.6.b Compliance with Permit Condition III.10.G.6.a. of this Permit will be regarded as operating within the emission limits specified in Permit Table III.10.G.D., as approved pursuant to Permit Conditions III.10.C.11.b., III.10.C.11.c., or III.10.C.11.d. of this Permit.

III.10.G.6.c All air pollution control devices and capture systems in the Pretreatment Plant Miscellaneous Unit Systems will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the above equipment is properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.G.6.d The Permittees will ensure that for all dangerous and/or mixed waste areas, systems, and units contained in the Pretreatment Plant (as specified in Permit Tables III.10.E.A, III.10.F.A, and III.10.G.A, as approved pursuant to Permit Conditions III.10.E.9.e.xii., III.10.F.7.d.iv., and III.10.G.10.e.ix., respectively), the Pretreatment Vessel Vent Process System specified in Permit Table III.10.G.A.i will be in operation prior to waste being introduced into these dangerous and/or mixed waste areas, systems, and units contained in the Pretreatment Building. At any time the Pretreatment Vessel Vent Process System ceases to operate or produces insufficient vacuum to recover emissions from the areas, systems, or units, the Permittees will not commence new treatment activities within the dangerous and mixed waste areas, systems, or units contained in the Pretreatment Building, and take measures to minimize evolution of emissions from on-going treatment, and will not receive new dangerous and/or mixed waste shipments into the Pretreatment Building. The Permittees will not re-commence new treatment activities until the Pretreatment Vessel Vent Process System is operational and producing sufficient vacuum to recover emissions.

III.10.G.7 Inspections [WAC 173-303-680(3)]

III.10.G.7.a The Permittees will inspect the Pretreatment Plant Miscellaneous Unit Systems in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.G.7.b The inspection data for Pretreatment Plant Miscellaneous Unit Systems will be recorded, and the records will be placed in the WTP Unit operating record for the Pretreatment Plant Miscellaneous Unit Systems, in accordance with Permit Condition III.10.C.4.

III.10.G.8 Recordkeeping

The Permittees will record and maintain in the WTP Unit operating record for the Pretreatment Plant Miscellaneous Unit Systems, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4 and III.10.C.5.

III.10.G.9 Closure

The Permittees will close the Pretreatment Plant Miscellaneous Unit Systems in accordance with Operating Unit Group 10, Addendum H, as approved pursuant to Permit Condition III.10.C.8.

III.10.G.10 Compliance Schedule

III.10.G.10.a All information identified for submittal to Ecology in a. through e. of this compliance schedule must be signed and certified in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.G.1.d. [WAC 173-303-806(4)].

III.10.G.10.b The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to construction of each secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems (per level) as identified in Permit Tables III.10.G.A and III.10.G.B, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.2, 8.4, 8.5, 8.7, 8.8, 8.9, 8.11, and 8.12 of this Permit. At a minimum, engineering information specified below will show the following as described in WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):

III.10.G.10.b.i IQRPE Reports (specific to foundation, secondary containment, and leak detection system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 8.0 of this Permit may be included in the report by reference and should include drawing and document numbers. IQRPE Reports will be consistent with the information separately provided in ii. through ix. below [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.G.10.b.ii Design drawings (General Arrangement Drawings, in plan) and specifications for the foundation, secondary containment, including, liner installation details, and leak detection methodology [Note: leak detection systems for areas where daily, direct, or remote visual inspection is not feasible, will be continuous in accordance with WAC 173-303-640(4)(e)(iii)(C)]. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f) and WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.G.10.b.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the secondary containment system. This information will demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [WAC 173-303-640(4)(c)(ii), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.b.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.b.v Secondary containment/foundation and leak detection systems materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials), as applicable [WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.b.vi Detailed description of how the secondary containment for each miscellaneous unit system will be installed in compliance with WAC 173-303-640(3)(c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B);

III.10.G.10.b.vii Submit Permit Table III.10.G.B. completed to provide for all secondary containment sumps and floor drains, the information as specified in each column heading, consistent with information to be provided in i. through vi. above;

III.10.G.10.b.viii Documentation that secondary containment and leak detection systems will not accumulate hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.b.ix A detailed description of how miscellaneous unit design provides access for conducting future miscellaneous unit integrity assessments [WAC 173-303-640(3)(b) and WAC 173-303-806(4)(i)(i)(B)].

III.10.G.10.c The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of each Pretreatment Plant Miscellaneous Unit System as identified in Permit Tables III.10.G.A and III.10.G.B, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendix 8.1 through 8.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 and in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.G.10.c.i IQRPE Reports (specific to miscellaneous unit) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 8.0 of this Permit may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information separately provided in ii. through xi. below and the IQRPE Report specified in Permit Condition III.10.G.10.b.i. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.G.10.c.ii Design drawings (General Arrangement Drawings in plan , Process Flow Diagrams, Piping and Instrumentation Diagrams [including pressure control systems], and Mechanical Drawings) and specifications, and other information specific to miscellaneous units (to show location and physical attributes of each miscellaneous unit), [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.G.10.c.iii Miscellaneous unit design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the miscellaneous unit(s). Structural support calculations specific to off-specification, non-standard, and field fabricated miscellaneous units will be submitted for incorporation into the

Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.c.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.c.v Miscellaneous unit materials selection documentation (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.G.10.c.vi Miscellaneous unit vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.c.vii System Description related to miscellaneous units will be submitted for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)].

III.10.G.10.c.viii Mass and energy balance for normal projected operating conditions used in developing the Piping and Instrumentation Diagrams and the Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.c.ix A detailed description of how the miscellaneous unit will be installed in compliance with WAC 173-303-640(3)(c), (d), and (e), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.G.10.c.x Documentation that miscellaneous units are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.c.xi Documentation that miscellaneous units are designed to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW, for incorporation into the Administrative Record [WAC 173-303-640(5)(e), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.d The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of equipment as identified in Permit Tables III.10.G.A and III.10.G.B, not addressed in Permit Condition III.10.G.10.c., engineering information as specified below for incorporation into Operating Unit Group 10, Appendices 8.1through 8.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.G.10.d.i IQRPE Reports (specific to equipment) will include a review of design drawings, calculations, and other information as applicable, on which the certification report is based. The reports will include, but not be limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 8.0 of this Permit may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information provided separately in ii. through xiii. below and the IQRPE Reports specified in Permit Conditions III.10.G.10.b. and III.10.G.10.c.,[WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.d.ii Design drawings (Process Flow Diagrams, Piping and Instrumentation Diagrams [including pressure control systems]) specifications and other information specific to equipment (these drawings should include all equipment such as pipe, valves, fittings, pumps, instruments, etc.) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.d.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the equipment [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(f), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.d.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil and water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.G.10.d.v Materials selection documentation for equipment (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.G.10.d.vi Vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, for equipment will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(iv)];

III.10.G.10.d.vii Miscellaneous unit, equipment, and leak detection system instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)].

III.10.G.10.d.viii System Descriptions related to equipment and system descriptions related to leak detection systems, for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.d.ix A detailed description of how the equipment will be installed and tested [WAC 173-303-640(3)(c) through (e) and WAC 173-303-640(4)(b) and (c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.d.x For process monitoring, control, and leak detection system instrumentation for the WTP Unit Miscellaneous Unit Systems as identified in Permit Table III.10.G.C, a detailed description of how the process monitoring, control, and leak detection system instrumentation will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), WAC 173-303-806(4)(c)(vi), and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.d.xi Mass and energy balance for projected normal operating conditions, used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified, for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.d.xii Documentation that miscellaneous units are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)].

III.10.G.10.d.xiii Leak detection system documentation (e.g. vendor information, etc.) consistent with information submitted under Permit Condition III.10.G.10.c.ii. and Permit Conditions III.10.G.10.d.ii., vii., viii., and x. above, will be submitted for incorporation into the Administrative Record.

III.10.G.10.e Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following as specified below for incorporation into Operating Unit Group 10, Appendix 8.15, except Permit Condition III.10.G.10.e.i., which will be incorporated into Operating Unit Group 10, Addendum E, of this Permit. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.G.10.b., c., d., and e., III.10.C.3.e., and III.10.C.11.b., as approved by Ecology.

III.10.G.10.e.i Integrity assessment program and schedule for the Pretreatment Plant Miscellaneous Unit Systems will address the conducting of periodic integrity assessments on the Pretreatment Plant Miscellaneous Unit Systems over the life of the systems, as specified in Permit Condition III.10.G.10.b.ix. and WAC 173-303-640(3)(b), in accordance with WAC 173-303-680, and descriptions of procedures for addressing problems detected during integrity assessments. The schedule must be based on past integrity assessments, age of the system, materials of construction, characteristics of the waste, and any other relevant factors [WAC 173-303-640(3)(b), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.ii Detailed plans and descriptions, demonstrating the leak detection system is operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous and/or mixed waste or accumulated liquid in the secondary containment system within twenty-four (24) hours WAC 173-303-640(4)(c)(iii). Detection of a leak of at least 0.1 gallons per hour within twenty-four (24) hours is defined as being able to detect a leak within twenty-four (24) hours. Any exceptions to this criteria must be approved by Ecology in accordance with WAC 173-303-680, WAC 173-303-640(4)(c)(iii), and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.iii Detailed operational plans and descriptions, demonstrating that spilled or leaked waste and accumulated liquids can be removed from the secondary containment system within twenty-four (24) hours [WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.iv Descriptions of operational procedures demonstrating appropriate controls and practices are in place to prevent spills and overflows from the Pretreatment Plant Miscellaneous Unit Systems, or containment systems, in compliance with WAC 173-303-640(5)(b)(i) through (iii), in accordance with WAC 173-303-680 [WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.v Description of procedures for investigation and repair of the Pretreatment Plant Miscellaneous Unit Systems [WAC 173-303–640(6) and WAC 173-303-640(7)(e) and (f), in accordance with WAC 173-303-680, WAC 173-303-320, WAC 173-303-806(4)(a)(v), and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.vi Updated Addendum C, Narrative Descriptions, Tables and Figures as identified in Permit Tables III.10.G.A and III.10.G.B., as modified pursuant to Permit Condition III.10.G.10.e.ix., and updated to identify routinely non-accessible Pretreatment Plant Miscellaneous Unit Systems [WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.e.vii Descriptions of procedures for management of ignitable and reactive, and incompatible dangerous and/or mixed waste, in accordance with WAC 173-303-640(9) and (10), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B).

III.10.G.10.e.viii A description of the tracking system used to track dangerous and/or mixed waste generated throughout the Pretreatment Plant Miscellaneous Unit Systems, pursuant to WAC 173-303-380.

III.10.G.10.e.ix Permit Table III.10.G.A, amended as follows [WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)]:

A. Under column 1, update and complete list of dangerous and mixed waste Pretreatment Plant Miscellaneous Unit Systems, including plant items which comprise each system (listed by item number).

B. Under column 2, update and complete system designations.

C. Under column 3, replace the 'Reserved' with the Operating Unit Group 10, Appendix 8.0 subsections specific to miscellaneous unit systems as listed in column 1.

D. Under column 4, update and complete list of narrative description tables and figures.

E. Under column 5, update and complete maximum operating volume for each miscellaneous unit, as applicable.

F. Permit Table III.10.G.A.i., amended as follows:

1. Under column 1, update and complete list of plant items that comprise the Pretreatment Plant Vessel Vent System (listed by item number).
2. Under column 2, update and complete designations.
3. Under column 3, replace the 'Reserved' with the Operating Unit Group 10, Appendix 8.0, subsections (e.g., 9.1, 9.2, etc.) specific to systems as listed in column 1.
4. Under column 4, update and complete list of narrative description tables and figures.

III.10.G.10.e.x Permit Table III.10.G.C. will be completed for Pretreatment Plant Miscellaneous Unit System process and leak detection system monitors and instruments (to include, but not be limited to: instruments and monitors measuring and/or controlling flow, pressure, temperature, density, pH, level, humidity, and emissions) to provide the information as specified in each column heading. Process and leak detection system monitors and instruments for critical systems as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b.and for operating parameters as required to comply with Permit Condition III.10.C.3.e.iii. will be addressed. Process monitors and instruments for non-waste management operations (e.g., utilities, raw chemical storage, non-contact cooling waters, etc.) are excluded from this permit condition [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.e.xi Supporting documentation for operating trips and expected operating range as specified in Permit Table III.10.G.C., as approved pursuant to Permit Condition III.10.G.10.e.x. [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(B), WAC 173-303-806(4)(i)(iv), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.e.xii Documentation of process and leak detection instruments and monitors (as listed in Permit Table III.10.G.C.) for the Pretreatment Plant Miscellaneous Unit Systems to include, but not be limited to, the following [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)]:

A. Procurement Specifications.

B. Location used.

C. Range, precision, and accuracy.

D. Detailed descriptions of calibration/functionality test procedures (e.g., method number [ASTM]) or provide a copy of manufacturer's recommended calibration procedures.

E. Calibration/functionality test, inspection, and routine maintenance schedules and checklists, including justification for calibration, inspection and maintenance frequencies, criteria for identifying instruments found to be significantly out of calibration, and corrective action to be taken for instruments found to be significantly out of calibration (e.g., increasing frequency of calibration, instrument replacement, etc.).

F. Equipment instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)].

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Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
Waste Feed Evaporation Process System FEP-SEP-00001A (Waste Feed Evaporator Separator Vessel) FEP-SEP-00001B (Waste Feed Evaporator Separator Vessel)	FEP	**24590-PTF** -3PS-MEVV-T0001, Rev 2 -M5-V17T-00004001, Rev 3 -M5-V17T-00004002, Rev 3 -M6-FEP-00001001, Rev 1 -M6-FEP-00001002, Rev 0 -M6-FEP-00001003, Rev 0 -M6-FEP-00002001, Rev 0 -M6-FEP-00002002, Rev 1 -M6-FEP-00002003, Rev 0 -M6-FEP-00003001, Rev 0 -M6-FEP-00003002, Rev 0 -M6-FEP-00004001, Rev 0 -M6-FEP-00004002, Rev 1 -M6-FEP-00004003, Rev 0 -M6-FEP-00005001, Rev 0 -MVD-FEP-P0001, Rev 2 -MVD-FEP-P0002, Rev 2 -MVD-FEP-P0003, Rev 1 -MVD-FEP-00006, Rev 5 -MVD-FEP-00007, Rev 5 -MV-FEP-P0001, Rev 0 -MV-FEP-P0002, Rev 0 -N1D-FEP-00002, Rev 6	Section 4.1.2.2.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	FEP-SEP-00001A = 14,512 FEP-SEP-00001B = 14, 512

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-N1D-FEP-P0003, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7		
Waste Feed Evaporation Process System (Cont.) FEP-COND-00001A (Waste Evaporator Primary Condenser) FEP-COND-00001B (Waste Evaporator Primary Condenser) FEP-COND-00002A (Waste Evaporator Intercondenser) FEP-COND-00002B (Waste Evaporator Intercondenser) FEP-COND-00003A (Waste Evaporator Aftercondenser) FEP-COND-00003B (Waste Evaporator Aftercondenser)	FEP	**24590-PTF** -3PS-MEVV- T0001, Rev 2 -M5-V17T-00004001, Rev 3 -M5-V17T-00004002, Rev 3 -M6-FEP-00003002, Rev 0 -M6-FEP-00005001, Rev 0 -MED-FEP-P0003, Rev 0 -MED-FEP-P0004, Rev 0 -MED-FEP-P0005, Rev 0 -MED-FEP-P0006, Rev 0 -MED-FEP-P0007, Rev 0 -MED-FEP-P0008, Rev 0 -N1D-FEP-P0008, Rev 0 -N1D-FEP-00009, Rev 3 -N1D-FEP-00010, Rev 3 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7	Section 4.1.2.2.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	N/A
Waste Feed Evaporation Process System (Cont.) FEP-RBLR-00001A (Waste Feed Evaporator Reboiler)	FEP	**24590-PTF** -3PS-MEVV-T0001, Rev 2 -M5-V17T-00004001, Rev 3 -M5-V17T-00004002, Rev 3	Section 4.1.2.2.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit	N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
FEP-RBLR-00001B (Waste Feed Evaporator Reboiler)		-MED-FEP-P0010, Rev 0 -N1D-FEP-P0008, Rev 0 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7	Group 10, Addendum C of this Permit.	
Cesium Nitric Acid Recovery Process System CNP-EVAP-00001 (Cesium Evaporator Separator Vessel)	CNP	**24590-PTF** -3PS-MEVV-T0002, Rev 4 -M5-V17T-00014, Rev 2 -M6-CNP-00001001, Rev 0 -M6-CNP-00001002, Rev. 0 -M6-CNP-00001003, Rev. 0 -M6-CNP-00002001, Rev 0 -M6-CNP-00002002, Rev 0 -M6-CNP-00002003, Rev 0 -M6-CNP-00008001, Rev 0 -M6-CNP-00008002, Rev 0 -M6-CNP-00010001, Rev 0 -M6-CNP-00010002, Rev 0 -MV-CNP-P0001, Rev 0 -MV-CNP-P0002, Rev 1 -MV-CNP-P0005, Rev 0 -MVD-CNP-P0003, Rev 1 -MVD-CNP-P0010, Rev 0 -MVD-CNP-00006, Rev 6 -N1D-CNP-P0005, Rev 1	Section 4.1.2.6.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	CNP-EVAP-00001 = RESERVED

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-N1D-CNP-P0006, Rev 3 -N1D-CNP-P0009, Rev 1 -N1D-CNP-P0011, Rev 1 -P1-P01T-00001, Rev 8 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6		
Cesium Nitric Acid Recovery Process System (Cont.) CNP-HX-00001 (Cesium Evaporator Concentrate Reboiler	CNP	**24590-PTF** -3PS-MEVV-T0002, Rev 4 -M5-V17T-P0014, Rev 2 -M6-CNP-00001001, Rev 0 -M6-CNP-00001002, Rev 0 -M6-CNP-00001003, Rev 0 -M6-CNP-00002001, Rev 0 -M6-CNP-00002002, Rev 0 -M6-CNP-00002003, Rev 0 -M6-CNP-00008, Rev 2 -MED-CNP-00003, Rev 4 -MED-CNP-00004, Rev 5 -MED-CNP-00010, Rev 3 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4.1.2.6.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
Cesium Nitric Acid Recovery Process System (Cont.) CNP-DISTC-00001 (Cesium Evaporator Nitric Acid Rectifier Column)	CNP	**24590-PTF** -M5-V17T-00014, Rev 2 -M6-CNP-00010, Rev 2 -N1D-CNP-00001, Rev 1 -P1-P01T-00003, Rev 4 -3PS-MEVV-T0002, Rev 4	Section 4.1.2.6.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	RESERVED
Cesium Nitric Acid Recovery Process System (Cont.) CNP-HX-00002 (Cesium Evaporator Primary Condenser) CNP-HX-00003 (Cesium Evaporator Inter-Condenser) CNP-HX-00004 (Cesium Evaporator After-Condenser)	CNP	**24590-PTF** -M5-V17T-00014, Rev 2 -M6-CNP-00001001, Rev 0 -M6-CNP-00001002, Rev 0 -M6-CNP-00001003, Rev 0 -M6-CNP-00002001, Rev 0 -M6-CNP-00002002, Rev 0 -M6-CNP-00002003, Rev 0 -M6-CNP-00008001, Rev 0 -M6-CNP-00010, Rev 2 -MED-CNP-00003, Rev 4 -MED-CNP-00004, Rev 5 -MED-CNP-00005, Rev 4 -MED-CNP-00010, Rev 3 -N1D-CNP-P0002, Rev 1 -N1D-CNP-P0003, Rev 1 -N1D-CNP-P0012, Rev 1	Section 4.1.2.6.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	N/A N/A N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6 -3PS-MEVV-T0002, Rev 4		
Treated LAW Evaporation Process System TLP-SEP-00001 (Treated LAW Evaporator Separator Vessel)	TLP	**24590-PTF** -3PS-MEVV- T0001, Rev 2 -M5-V17T-00005, Rev 2 -M6-TLP-00001, Rev 3 -M6-TLP-00002001, Rev 0 -M6-TLP-00002002, Rev 0 -M6-TLP-00002003, Rev 0 -M6-TLP-00002004, Rev 0 -M6-TLP-00003001, Rev 0 -M6-TLP-00003002, Rev 0 -M6-TLP-00003003, Rev 0 -M6-TLP-00003004, Rev 0 -M6-TLP-00005001, Rev 0 -M6-TLP-00005002, Rev 0 -M6-TLP-00005003, Rev 0 -M6-TLP-00005004, Rev 0 -M6-TLP-00005005, Rev 0 -M6-TLP-00006001, Rev 0 -M6-TLP-00006002, Rev 0	Section 4.1.2.11; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	TLP-SEP-00001 = 13,359

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-M6-TLP-00006003, Rev 0 -M6-TLP-00006004, Rev 0 -M6-TLP-00006005, Rev 0 -MVD-TLP-P0001, Rev 2 -MVD-TLP-P0002, Rev 2 -MVD-TLP-P0004, Rev 1 -MVD-TLP-00005, Rev 7 -MV-TLP-P0001, Rev 1 -MV-TLP-P0002, Rev 1 -N1D-TLP-P0001, Rev 2 -N1D-TLP-P0005, Rev 3 -N1D-TLP-P0006, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4		
<u>Treated LAW Evaporation Process System (Cont.)</u> TLP-COND-00001 (Treated LAW Primary Condenser) TLP-COND-00002 (Treated LAW Inter-condenser) TLP-COND-00003 (Treated LAW After-condenser)	TLP	**<u>24590-PTF</u>** -3PS-MEVV- T0001, Rev 2 -M5-V17T-00005, Rev 2 -M6-TLP-00002001, Rev 0 -M6-TLP-00002002, Rev 0 -M6-TLP-00002003, Rev 0 -M6-TLP-00002004, Rev 0 -M6-TLP-00003001, Rev 0 -M6-TLP-00003002, Rev 0	Section 4.1.2.11; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-M6-TLP-00003003, Rev 0 -M6-TLP-00003004, Rev 0 -M6-TLP-00005001, Rev 0 -M6-TLP-00005002, Rev 0 -M6-TLP-00005003, Rev 0 -M6-TLP-00005004, Rev 0 -M6-TLP-00005005, Rev 0 -M6-TLP-00006001, Rev 0 -M6-TLP-00006002, Rev 0 -M6-TLP-00006003, Rev 0 -M6-TLP-00006004, Rev 0 -M6-TLP-00006005, Rev 0 -MED-TLP-P0001, Rev 0 -MED-TLP-00002, Rev 4 -MED-TLP-00003, Rev 4 -MV-TLP-P0001, Rev 1 -MV-TLP-P0002, Rev 1 -N1D-TLP-P0002, Rev 0 -N1D-TLP-P0003, Rev 4 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4		
Treated LAW Evaporation Process System (Cont.)	TLP	**24590-PTF** -3PS-MEVV- T0001, Rev 2	Section 4.1.2.11; Table C-8; and Figures C1-1,	N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
TLP-RBLR-00001 (Treated LAW Evaporator Reboiler)		-M5-V17T-00005, Rev 5 -MV-TLP-P0001, Rev 1 -MV-TLP-P0002, Rev 1 -N1D-TLP-P0011, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4	C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	
Spray Decontamination and Sizing System PIH-TTBL-00001 (Spray Decontamination Turntable) PIH-TTBL-00002 (Remote Repair Turntable PIH-BENCH-00003 (Size Reduction Table) This miscellaneous unit is exempt from the requirements of WAC-173-303-640.	PIH	RESERVED	Section 4.2.4.2.1; Table 4-8; and Figure 4A-128 of Operating Unit 10, Chapter 4 of this Permit.	N/A
Hot Cell Waste Management Unit Hot Cell Floor This miscellaneous unit is exempt from the requirements of WAC-173-303-640.	NA	RESERVED	Section 4.2.4.1; Table 4-8; and Figure 4A-128 of Operating Unit 10, Chapter 4 of this Permit.	RESERVED

[a] The Pretreatment Vessel Vent Process (PVP), Process Vessel Vent Systems (PVV), Pulse Jet Mixer Exhaust System (PJV), and Pretreatment Treated LAW Evaporator Separator Vessel System (TLP) specified in Permit Table III.10.G.A.i is shared between the Pretreatment Plant Miscellaneous Unit Systems. Any references in this Permit to the individual Pretreatment Plant Miscellaneous Unit Systems are also a reference to the Pretreatment Vessel Vent Process (PVP), Process Vessel Vent Systems (PVV), Pulse Jet Mixer Exhaust System (PJV), and Pretreatment Treated LAW Evaporator Separator Vessel System (TLP) Systems. Any reference in this Permit to Permit Table III.10.G.A is also a reference to Permit Table III.10.G.A.i.

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Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
Pretreatment Vessel Vent Process System PVP-SCB-00002 (Vessel Vent Caustic Scrubber)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -M6-PVP-00002, Rev 3 -M6-PVP-00017001, Rev 0 -M6-PVP-00017002, Rev 0 -M6-PVP-00017003, Rev 0 -M6-PWD-00044, Rev 3 -MKD-PVP-P0002, Rev 2 -MVD-PVP-P0001, Rev 0 -MV-PVP-P0002, Rev 0 -N1D-PVP-P0001, Rev 1 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Vessel Vent Process System (Cont.) PVP-HEME-00001A (Vessel Vent HEME, Mist eliminator) PVP-HEME-00001B (Vessel Vent HEME, Mist Eliminator) PVP-HEME-00001C (Vessel Vent HEME, Mist Eliminator)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
Pretreatment Vessel Vent Process System (Cont.) PVP-HX-00002 (Vessel Vent Scrubbing Liquid Cooler)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M6-PVP-00017001, Rev 0 -M6-PVP-00017002, Rev 0 -M6-PVP-00017003, Rev 0 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Vessel Vent Process System (Cont.) PVP-OXID-00001 (Vessel Vent VOC Oxidizer Unit)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -M6-PVP-00017001, Rev 0 -M6-PVP-00017002, Rev 0 -M6-PVP-00017003, Rev 0 -M6-PVP-000018001, Rev 1 -M6-PVP-000018002, Rev 0 -N1D-PVP-P0002, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Vessel Vent Process System (Cont.) PVP-CLR-00001 (Vessel Vent Aftercooler)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-00001, Rev 7	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
		-P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	
Pretreatment Vessel Vent Process System (Cont.) PVP-ADBR-00001A (Vessel Vent Carbon Bed Absorber) PVP-ADBR-00001B (Vessel Vent Carbon Bed Absorber)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Vessel Vent Process System (Cont.) PVP-FILT-00001 (Vessel Vent Adsorber Outlet Filter)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Process Vessel Vent System PVV-HEPA-00001A (Vessel Vent Primary HEPA Filter) PVV-HEPA-00001B (Vessel Vent Primary HEPA Filter)	PVV	**24590-PTF** -M5-V17T-00021001, Rev 2 -P1-P01T-P0002, Rev 7	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
PVV-HEPA-00002A (Vessel Vent Secondary HEPA Filter) PVV-HEPA-00002B (Vessel Vent Secondary HEPA Filter)			
Process Vessel Vent System (Cont.) PVV-FAN-00001A (Vessel Vent Exhaust Fan) PVV-FAN-00001B (Vessel Vent Exhaust Fan)	PVV	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4.1.2.16; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Pulse Jet Mixer Exhaust Vent System PJV-HEPA-00001A (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00001B (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00001C (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00001D (PJV Primary Exhaust HEPA Filter)	PJV	**24590-PTF** -M5-V17T-00021002, Rev 2 -M6-PJV-00001, Rev 3 -M6-PJV-00002, Rev 3 -M6-PJV-00004001, Rev 0 -N1D-PJV-P0001, Rev 1 -P1-P01T-00001, Rev 7	Section 4.1.2.17; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
PJV-HEPA-00001E (PJV Primary Exhaust HEPA Filter)			
PJV-HEPA-00001F (PJV Primary Exhaust HEPA Filter)			
PJV-HEPA-00001G (PJV Primary Exhaust HEPA Filter)			
PJV-HEPA-00002A (PJV Secondary Exhaust HEPA Filter)			
PJV-HEPA-00002B (PJV Secondary Exhaust HEPA Filter)			
PJV-HEPA-00002C (PJV Secondary Exhaust HEPA Filter)			
PJV-HEPA-00002D (PJV Secondary Exhaust HEPA Filter)			
PJV-HEPA-00002E (PJV Secondary Exhaust HEPA Filter)			
PJV-HEPA-00002F (PJV Secondary Exhaust HEPA Filter)			

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
Pretreatment Pulse Jet Mixer Exhaust Vent System (Cont.) PJV-FAN-00001A (PJV Exhaust Fan) PJV-FAN-00001B (PJV Exhaust Fan) PJV-FAN-00001C (PJV Exhaust Fan)	PJV	**24590-PTF** -M5-V17T-00021002, Rev 2 -M6-PJV-00001, Rev 3 -M6-PJV-00002, Rev 3 -M6-PJV-00004001, Rev 0 -N1D-PJV-P0001, Rev 1 -P1-P01T-00001, Rev 7	Section 4.1.2.17; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Pulse Jet Mixer Exhaust Vent System (Cont.) PJV-DMST-00002A (PJV Demister) PJV-DMST-00002B (PJV Demister) PJV-DMST-00002C (PJV Demisters)	PJV	**24590-PTF** -M5-V17T-00021002, Rev 2 -M6-PJV-00001, Rev 3 -M6-PJV-00002, Rev 3 -M6-PJV-00004001, Rev 0 -N1D-PJV-P0001, Rev 1 -P1-P01T-00003, Rev 4	Section 4.1.2.17; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

[a] The Pretreatment Vessel Vent Process (PVP), Process Vessel Vent Systems (PVV), and Pulse Jet Mixer Exhaust System (PJV) specified in Permit Table III.10.G.A.i are shared between the Pretreatment Plant Miscellaneous Unit Systems. Any references in this Permit to the individual Pretreatment Plant Miscellaneous Unit Systems are also a reference to the Pretreatment Vessel Vent Process (PVP), Process Vessel Vent Systems (PVV), and Pulse Jet Mixer Exhaust System (PJV) Systems. Any reference in this Permit to Permit Table III.10.G.A is also a reference to Permit Table III.10.G.A.i.

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Table III.10.G.B – Pretreatment Plant Miscellaneous Unit Secondary Containment Systems Including Sumps, Bulges, and Floor Drains

Sump, Bulge or Floor Drain I.D.# & Room Location	Maximum Sump/Bulge (gallons), or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawings No.'s, Specification No.'s etc.)
PVP-ZY-00037-S11B-03, P-0105 (PVP-BULGE-00001, El. 0')			3" Stainless Steel	**24590-PTF** -M6-PVP-00017002, Rev 0
PVP-ZY-00036-S11B-03, P-0101A (PVP-BULGE-00002, El. 0')			3" Stainless Steel	**24590-PTF** -M6-PVP-00018002, Rev 0
PVP-ZY-00056-S11B-03, P-0302 (PVP-BULGE-00014, El. 56')			3" Stainless Steel	**24590-PTF** -M6-PVP-00017003, Rev 0
PWD-FD-00323P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00324 P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00325 P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00326 P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00327 P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00512 P-0320 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00513 P-0320 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3

PWD-FD-00514 P-0320 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00515 P-0325 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00516 P-0325 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00517 P-0325 Drain, El. 56'	655	N/A	8" Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00557 P-0430 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00561 P-0430 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).				

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Table III.10.G.C. – Pretreatment Plant Miscellaneous Unit System Process and Leak Detection Instruments and Parameters

Miscellaneous Unit System Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Failure State	Expected Range	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PVP-BULGE-00001[a]	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PVP-BULGE-00014[a]	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Sump locator (including P&ID designator) is located on Permit Table III.10.G.B – Pretreatment Plant Miscellaneous Unit Secondary Containment Systems Including Sumps, Bulges, and Floor Drains.

Table III.10.G.D. – Pretreatment Plant Miscellaneous Unit Systems Estimated Emission Rates

Chemicals	CAS Number	Emission Rates (grams/second)
RESERVED	RESERVED	RESERVED

III.10.H LAW VITRIFICATION SYSTEM – SHORT TERM MISCELLANEOUS THERMAL TREATMENT UNIT-SHAKEDOWN, DEMONSTRATION TEST, AND POST DEMONSTRATION TEST

For purposes of Permit Section III.10.H, where reference is made to WAC 173-303-640, the following substitutions apply: substituting the terms "LAW Vitrification System" for "tank system(s)," "sub-system(s)" for "tank(s)," "sub-system equipment" for "ancillary equipment," and "sub-system(s) or sub-system equipment of a LAW Vitrification System" for "component(s)" in accordance with WAC 173-303-680.

III.10.H.1 General Conditions During Shakedown, Demonstration Test, and Post-Demonstration Test for LAW Vitrification System

III.10.H.1.a Construction and Maintenance [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-340].

III.10.H.1.a.i The Permittees will construct the LAW Vitrification System (listed in Permit Tables III.10.H.A and B., as approved/modified pursuant to Permit Condition III.10.H.5.) as specified in Permit Condition III.10.H.1. and Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 9.1 through 9.15 and 9.17 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.a. through d., and III.10.H.5.f.

III.10.H.1.a.ii The Permittees will construct all containment systems for the LAW Vitrification System as specified in Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 9.2 and 9.4 through 9.14 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.a. through d.

III.10.H.1.a.iii The Permittees will ensure all certifications required by specialists (e.g., independent, qualified registered professional engineer, independent corrosion expert, independent, qualified installation inspector, etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10.:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new LAW Vitrification System or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following LAW Vitrification System components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)) in accordance with WAC 173-303-680).

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

III.10.H.1.a.iv The Permittees must ensure that proper handling procedures are adhered to in order to prevent damage to the LAW Vitrification System during installation. Prior to covering, enclosing, or placing the new LAW Vitrification System or component in use, an independent, qualified, installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of similar systems or components, must inspect the system for the presence of any of the following items:

A. Weld breaks.

B. Punctures.

C. Scrapes of protective coatings.

D. Cracks.

E. Corrosion.

F. Other structural damage or inadequate construction/installation.

All discrepancies must be remedied before the LAW Vitrification System is covered, enclosed, or placed in use [WAC 173-303-640(3)(c), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.v For the LAW Vitrification System or components that are placed underground and that are back-filled, the Permittees must provide a backfill material that is a non-corrosive, porous, homogeneous substance. The backfill must be installed so that it is placed completely around the LAW Vitrification System and compacted to ensure that the LAW Vitrification System is fully and uniformly supported [WAC 173-303-640(3)(d), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.vi The Permittees must test for tightness the LAW Vitrification System or components, prior to being covered, enclosed, or placed into use. If the LAW Vitrification System or components are found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the LAW Vitrification System being covered, enclosed, or placed in use [WAC 173-303-640(3)(e), in accordance with WAC 173-303-III.680(2) and (3)].

III.10.H.1.a.vii The Permittees must ensure the LAW Vitrification System equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction [WAC 173-303-640(3)(f), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.viii The Permittees must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided in Operating Unit Group 10, Appendices 9.9 and 9.11 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.b.i., III.10.H.5.b.iv., III.10.H.5.b.v., III.10.H.5.c.i., III.10.H.5.c.iv., III.10.H.5.c.v., III.10.H.5.d.i., III.10.H.5.d.iv., and III.10.H.5.d.v., or other corrosion protection if Ecology believes other corrosion protection is necessary to ensure the integrity of the LAW Vitrification System during use of the LAW Vitrification System. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation [WAC 173-303-640(3)(g), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.ix Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will obtain and keep on file in the WTP Unit operating record, written statements by those persons required to certify the design of the LAW Vitrification System and supervise the installation of the LAW Vitrification System, as specified in WAC 173-303-640(3)(b), (c), (d), (e), (f), and (g), in accordance with WAC 173-303-680, attesting that the LAW Vitrification System and corresponding containment system listed in Permit Tables III.10.H.A and III.10.H.B, as approved/modified pursuant to Permit Condition III.10.H.5., were properly designed and installed, and that repairs, in accordance with WAC 173-303-640(3)(c) and (e) were performed [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(h), in accordance with WAC 173-303-680(3)].

III.10.H.1.a.x The independent LAW Vitrification System installation inspection and subsequent written statements will be certified in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.H.1.a.iii., comply with all requirements of WAC 173-303-640(3)(h) in accordance with WAC 173-303-680, and will consider, but not be limited to, the following LAW Vitrification System installation documentation:

A. Field installation report with date of installation.

B. Approved welding procedures.

C. Welder qualification and certifications.

D. Hydro-test reports, as applicable, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Division 1; American Petroleum Institute (API) Standard 620, or Standard 650, as applicable.

E. Tester credentials.

F. Field inspector credentials.

G. Field inspector reports.

H. Field waiver reports.

I. Non-compliance reports and corrective action (including field waiver reports) and repair reports.

III.10.H.1.a.xi The Permittees will ensure periodic integrity assessments are conducted on the LAW Vitrification System, listed in Permit Table III.10.H.A, as approved/modified pursuant to Permit Condition III.10.H.5., over the term of this Permit in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.H.1.a.xii The Permittees will address problems detected during the LAW Vitrification System integrity assessments specified in Permit Condition III.10.H.1.a.xi. following the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c.

III.10.H.1.a.xiii All process monitors/instruments, as specified in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., will be equipped with operational alarms to warn of deviation, or imminent deviation from the limits specified in Permit Table III.10.H.F.

III.10.H.1.a.xiv The Permittees will install and test all process and leak detection system monitors/instrumentation as specified in Permit Tables III.10.H.C and III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5, in accordance with Operating Unit Group 10, Appendices 9.1, 9.2, and 9.14 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.d.x. and III.10.H.5.f.xvi.

III.10.H.1.a.xv Except during periods of LAW Vitrification System startup and shutdown, no dangerous and/or mixed waste will be treated in the LAW Vitrification System unless the operating conditions, specified under Permit Condition III.10.H.1.c. are complied with.

III.10.H.1.a.xvi The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the LAW Vitrification System if these substances could cause the subsystem, subsystem equipment, or the containment system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)]. This condition is not applicable to corrosion of LAW Vitrification System sub-system or sub-system equipment that are expected to be replaced as part of normal operations (e.g., melters).

III.10.H.1.a.xvii The Permittees will operate the LAW Vitrification System to prevent spills and overflows using controls and practices as required under WAC 173-303-640(5)(b) described in Permit Condition III.10.C.5 and Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(c)(ix)].

III.10.H.1.a.xviii For routinely non-accessible LAW Vitrification System sub-systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.H.5.e.vi., the Permittees will mark all routinely non-accessible LAW Vitrification System sub-systems access points with labels, or signs, to identify the waste contained in each LAW Vitrification System sub-system. The label, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the LAW Vitrification System sub-systems. For the purposes of this permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.H.1.a.xix For all LAW Vitrification System sub-systems not addressed in Permit Condition III.10.H.1.a.xviii., the Permittees will mark all these LAW Vitrification System sub-systems holding dangerous and/or mixed waste with labels, or signs, to identify the waste contained in the LAW Vitrification System sub-systems. The labels, or signs, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the LAW Vitrification System sub-systems [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.H.1.a.xx The Permittees will ensure that the secondary containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.H.A. and III.10.H.B, as approved/modified pursuant to Permit Condition III.10.H.5, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use of the LAW Vitrification System sub-systems. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303–640(4)(e)(i)(C), and WAC 173-303-640(6), in accordance with

WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.H.1.a.xxi The Permittees must immediately, and safely, remove from service any LAW Vitrification System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Conditions III.10.H.1.a.xxiii.,A. through D., and F. The affected LAW Vitrification System or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.H.1.a.xxiii.E. [WAC 173-303-640(7)(e) and (f), WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.H.1.a.xxii .An impermeable coating, as specified in Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.9, 9.11, and 9.12 of this Permit, as approved pursuant to Permit Condition III.10.H.5.b.v. will be maintained for all concrete containment systems and concrete portions of containment systems for each LAW Vitrification System sub-systems listed in Permit Tables III.10.H.A and III.10.H.B, as approved/modified pursuant to Permit Condition III.10.H.5 (concrete containment systems that do not have a liner, pursuant to WAC 173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2). The coating will prevent migration of any dangerous and mixed waste into the concrete. All coatings will meet the following performance standards:

A. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present;

B. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and mixed waste could migrate from the system; and

C. The coating must be compatible with the dangerous and mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(i)(i)(A)].

III.10.H.1.a.xxiii The Permittees will inspect all secondary containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.H.A and III.10.H.B, as approved/modified pursuant to Permit Condition III.10.H.5., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c) and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)]:

A. Immediately, and safely, stop the flow of dangerous and/or mixed waste into the LAW Vitrification System sub-systems or secondary containment system.

B. Determine the source of the dangerous and/or mixed waste.

C. Remove the dangerous and/or mixed waste from the containment area in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(7)(b). The dangerous and/or mixed waste removed from containment areas of the LAW Vitrification System sub-systems will be, as a minimum, managed as mixed waste.

D. If the cause of the release was a spill that has not damaged the integrity of the LAW Vitrification System sub-system, the Permittees may return the LAW Vitrification System sub-system to service in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(7)(e)(ii). In such case, the Permittees will take action to insure the incident that caused the dangerous and/or mixed waste to enter the containment system will not reoccur [WAC 173-303-320(3)].

E. If the source of the dangerous and/or mixed waste is determined to be a leak from the primary LAW Vitrification System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees will comply with the requirements of WAC 173-303-640(7) and take the following actions:

1. Close the LAW Vitrification System sub-system following procedures in WAC 173-303-640(7)(e)(i), in accordance with WAC 173-303-680 and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8., or

2. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.H.1.a.iii.) the LAW Vitrification System, in accordance with Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e.v., before the LAW Vitrification System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

F. The Permittees will document in the operating record actions/procedures taken to comply with A. through E. above as specified in WAC 173-303-640(6)(d), in accordance with WAC 173-303-680(2) and (3).

G. In accordance with WAC 173-303-680(2) and WAC 173-303-680 (3), the Permittees will notify and report releases to the environment to Ecology as specified in WAC 173-303-640(7)(d).

III.10.H.1.a.xxiv If liquids (e.g., dangerous and/or mixed waste leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C, listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal.

B. Measures implemented to ensure continued protection of human health and the environment.

C Current actions being taken to remove liquids from secondary containment.

III.10.H.1.a.xxv All air pollution control devices and capture systems in the LAW Vitrification System will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the air pollution control devices and capture systems in the LAW Vitrification System are properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.H.1.a.xxvi In all future narrative permit submittals, the Permittees will include LAW Vitrification sub-system names with the sub-system designation.

III.10.H.1.a.xxvii Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the LAW Vitrification System will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., III.10.C.9.e., and III.10.C.9.h.

III.10.H.1.a.xxviii For any portion of the LAW Vitrification System which has the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.H.1.a.xxix For each LAW Vitrification System sub-system holding dangerous waste which are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e), in accordance with WAC 173-303-680].

III.10.H.1.b Performance Standards

III.10.H.1.b.i The LAW Vitrification System must achieve a destruction and removal efficiency (DRE) of 99.99% for the principal organic dangerous constituents (PODCs) listed below [40 CFR §63.1203(c)(1), 40 CFR §63.1203(c)(2), in accordance with WAC 173-303-680(2)]:

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DRE in this permit condition will be calculated in accordance with the formula given below:

$DRE=[1-(W_{out}/W_{in})] \times 100\%$

Where:

W_{in}=mass feed-rate of one principal organic dangerous constituent (PODC) in a waste feed stream; and

W_{out}=mass emission rate of the same PODC present in exhaust emissions prior to release to the atmosphere.

III.10.H.1.b.ii Particulate matter emissions from the LAW Vitrification System will not exceed 34 mg/dscm (0.015 grains/dscf) [40 CFR §63.1203(b)(7), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.iii Hydrochloric acid and chlorine gas emissions from the LAW Vitrification System will not exceed 21 ppmv, combined [40 CFR §63.1203(b)(6), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.iv Dioxin and Furan TEQ emissions from the LAW Vitrification System will not exceed 0.2 nanograms (ng)/dscm [40 CFR §63.1203(b)(1), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.v Mercury emissions from the LAW Vitrification System will not exceed 45 µg/dscm [40 CFR §63.1203(b)(2), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.vi Lead and cadmium emissions from the LAW Vitrification System will not exceed 120 µg/dscm, combined [40 CFR §63.1203(b)(3), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.vii Arsenic, beryllium, and chromium emissions from the LAW Vitrification System will not exceed 97 μg/dscm, combined [40 CFR §63.1203(b)(4), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.viii Carbon monoxide (CO) emission from the LAW Vitrification System will not exceed 100 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system), dry basis [40 CFR §63.1203(b)(5)(i), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.ix Hydrocarbon emission from the LAW Vitrification System will not exceed 10 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system during demonstration testing required by this Permit), dry basis, and reported as propane [40 CFR §63.1203(b)(5)(ii), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.x If the emissions from the LAW Vitrification System exceed the emission rates listed in Permit Table III.10.H.E, as approved pursuant to Permit Condition III.10.C.11.b., the Permittees will notify Ecology in accordance with Permit Condition III.10.H.3.d.vii. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

The emission limits specified in Permit Conditions III.10.H.1.b.i. through III.10.H.1.b.ix. above, will be met for the LAW Vitrification System by limiting feed-rates as specified in Permit Tables III.10.H.D. and III.10.H.F., as approved/modified pursuant to Permit Condition III.10.H.5., compliance with operating conditions specified in Permit Condition III.10.H.1.c. (except as specified in Permit Condition III.10.H.1.b.xii.), and compliance with Permit Condition III.10.H.1.b.xi.

III.10.H.1.b.xi Treatment effectiveness, feed-rates and operating rates for dangerous and mixed waste management units contained in the LAW Building, but not included in Permit Table III.10.H.A, as approved/modified pursuant to Permit Condition III.10.H.5., will be as specified in Permit Sections III.10.D, III.10.E, III.10.F and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Conditions III.10.C.11.c. or III.10.C.11.d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

III.10.H.1.b.xii Except during periods of LAW Vitrification System startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.H.1.c.,will be regarded as compliance with the required performance standards identified in Permit Conditions III.10.H.1.b.i. through x. However, if it is determined that during the effective period of this Permit that compliance with the operating conditions in Permit Condition III.10.H.1.c. is not sufficient to ensure compliance with the performance standards specified in Permit Conditions III.10.H.1.b.i. through x., the Permit may be modified, revoked, or reissued pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g.

III.10.H.1.c Operating Conditions [WAC 173-303-670(6), in accordance with WAC 173-303-680(2) and (3)].

The Permittees will operate the LAW Vitrification System in accordance with Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.H.5.e.vi., Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e., and Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., except as modified pursuant to Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., III.10.H.4., and in accordance with the following:

III.10.H.1.c.i The Permittees will operate the LAW Vitrification System in order to maintain the systems and process parameters listed in Permit Tables III.10.H.C and III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., within the set-points specified in Permit Table III.10.H.F.

III.10.H.1.c.ii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., to automatically cut-off and/or lock-out the dangerous and mixed waste feed to the LAW Vitrification System when the monitored operating conditions deviate from the set-points specified in Permit Table III.10.H.F.

III.10.H.1.c.iii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., to automatically cut-off and/or lock-out the dangerous and mixed waste feed to the LAW Vitrification System when all instruments specified on Permit Table III.10.H.F for measuring the monitored parameter fail or exceed its span value.

III.10.H.1.c.iv The Permittees will operate the AWFCO systems, specified in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., to automatically cut-off and/or lock out the dangerous and/or mixed waste feed to the LAW Vitrification System when any portion of the LAW Vitrification System is bypassed. The terms "bypassed" and "bypass event" as used in Permit Sections III.10.H and III.10.I will mean if any portion of the LAW Vitrification System is bypassed so that gases are not treated as during the Demonstration Test.

III.10.H.1.c.v In the event of a malfunction of the AWFCO systems listed in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., the Permittees will immediately, manually cut-off the dangerous and mixed waste feed to the LAW Vitrification System. The Permittees will not restart the dangerous and/or mixed waste feed until the problem causing the malfunction has been identified and corrected.

III.10.H.1.c.vi The Permittees will manually cut-off the dangerous and mixed waste feed to the LAW Vitrification System when the operating conditions deviate from the limits specified in Permit Condition III.10.H.1.c.i., unless the deviation automatically activates the waste feed cut-off sequence specified in Permit Conditions III.10.H.1.c.ii., III.10.H.1.c.iii., and/or III.10.H.1.c.iv.

III.10.H.1.c.vii If greater than thirty (30) dangerous and mixed waste feed cut-off, combined, to the LAW Vitrification System occur due to deviations from Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., within a sixty (60) day period, the Permittees will submit a written report to Ecology within five (5) calendar days of the thirty-first exceedance including the information specified below. These dangerous and mixed waste feed cut-offs to the LAW Vitrification System, whether automatically or manually activated, are counted if the specified set points are deviated from while dangerous waste, mixed waste, and waste residues continue to be processed in the LAW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.H.F, from which the set-point is deviated:

A. The parameter(s) that deviated from the set-point(s) in Permit Table III.10.H.F.

B. The magnitude, dates, and duration of the deviations.

C. Results of the investigation of the cause of the deviations.

D. Corrective measures taken to minimize future occurrences of the deviations.

III.10.H.1.c.viii If any portion of the LAW Vitrification System is bypassed while treating dangerous and/or mixed waste it will be regarded as non-compliance with the operating conditions specified in Permit Condition III.10.H.1.c. and the performance standards specified in Permit Condition III.10.H.1.b. After such a bypass event, the Permittees will perform the following actions:

A. Investigate the cause of the bypass event.

B. Take appropriate corrective measures to minimize future bypasses.

C. Record the investigation findings and corrective measures in the operating record.

D. Submit a written report to Ecology within five (5) days of the bypass event documenting the result of the investigation and corrective measures.

III.10.H.1.c.ix The Permittees will control fugitive emissions from the LAW Vitrification System by maintaining the melters under negative pressure.

III.10.H.1.c.x Except during periods of vitrification system startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.H.1.c. will be regarded as compliance with the required performance standards identified in Permit Condition III.10.H.1.b. However, evidence that compliance with these operating conditions is insufficient to ensure compliance with the performance standards, will justify modification, revocation, or re-issuance of this Permit, in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g.

III.10.H.1.d Inspection Requirements [WAC 173-303-680(3)]

III.10.H.1.d.i The Permittees will inspect the LAW Vitrification System in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.H.1.d.ii The inspection data for LAW Vitrification System will be recorded, and the records will be placed in the WTP Unit operating record for the LAW Vitrification System, in accordance with Permit Condition III.10.C.4.

III.10.H.1.d.iii The Permittees will comply with the inspection requirements specified in Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.e Monitoring Requirements [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7) and WAC 173-303-807(2), in accordance with WAC 173-303-680(3)]

III.10.H.1.e.i Upon receipt of a written request from Ecology, the Permittees will perform sampling and analysis of the dangerous and mixed waste and exhaust emissions to verify that the operating requirements established in the Permit achieve the performance standards delineated in this Permit.

III.10.H.1.e.ii The Permittees will comply with the monitoring requirements specified in Operating Unit Group 10, Appendices 9.2, 9.3, 9.7, 9.13, 9.15 and 9.18 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.c., III.10.H.5.d., III.10.H.5.e., and III.10.H.5.f., as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.e.iii The Permittees will operate, calibrate, and maintain the carbon monoxide and hydrocarbon continuous emission monitors (CEM) specified in this Permit in accordance with Performance Specification 4B and 8A of 40 CFR Part 60, Appendix B, in accordance with Appendix to Subpart EEE of 40 CFR Part 63, and Operating Unit Group 10 Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.e.iv The Permittees will operate, calibrate, and maintain the instruments specified on Permit Tables III.10.H.C, and F, as approved/modified pursuant to Permit Condition III.10.H.5., in accordance with Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.f Recordkeeping Requirements [WAC 173-303-380 and WAC 173-303-680(3)]

III.10.H.1.f.i The Permittees will record and maintain in the WTP Unit operating record for the LAW Vitrification System, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4. and III.10.C.5., as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.f.ii The Permittees will record in the WTP Unit operating record the date, time, and duration of all automatic waste feed cutoffs and/or lockouts, including the triggering parameters, reason for the deviation, and recurrence of the incident. The Permittees will also record all incidents of AWFCO system function failures, including the corrective measures taken to correct the condition that caused the failure.

III.10.H.1.f.iii The Permittees will submit to Ecology a report semi-annually the first calendar year, and annually thereafter each calendar year within ninety (90) days following the end of the year. The report will include the following information:

A. Total dangerous and mixed waste feed processing time for the LAW Vitrification System;

B. Date/Time of all LAW Vitrification System startups and shutdowns;

C. Date/Time/Duration/Cause/Corrective Action taken for all LAW Vitrification System shutdowns caused by malfunction of either process or control equipment; and

D. Date/Time/Duration/Cause/Corrective Action taken for all instances of dangerous and/or mixed waste feed cut-off due to deviations from Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5.

III.10.H.1.f.iv The Permittees will submit an annual report to Ecology each calendar year within ninety (90) days following the end of the year of all quarterly CEM Calibration Error and Annual CEM Performance Specification Tests conducted in accordance with Permit Condition III.10.H.1.e.iii.

III.10.H.1.g Closure

The Permittees will close the LAW Vitrification System in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.H.2 Shakedown Period [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.2.a The shakedown period for the LAW Vitrification System will be conducted in accordance with Permit Condition III.10.H.1., Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified in accordance with Permit Conditions III.10.H.1.b.xii., III.10.H.2., and III.10.H.3.

III.10.H.2.b Duration of the Shakedown Period

III.10.H.2.b.i The shakedown period for the LAW Vitrification System will begin with the initial introduction of dangerous waste in the LAW Vitrification System following construction and will end with the start of the demonstration test.

III.10.H.2.b.ii The shakedown period will not exceed the following limits, as defined by hours, when the LAW Vitrification System is processing dangerous waste. The Permittees may petition Ecology for one extension of each shakedown phase for seven hundred and twenty (720) additional operating hours in accordance with Permit modification procedures specified in Permit Conditions III.10.C.2.e. and III.10.C.2.f.

Shakedown Phase 1: 720 hours

Shakedown Phase 2: 720 hours

III.10.H.2.b.iii Shakedown Phase 2 will not be commenced until documentation has been submitted to Ecology verifying that the LAW Vitrification System has operated at a minimum of 75% of the shakedown Phase 1 feed-rate limit for two (2) separate eight (8) consecutive hour periods with no AWFCOs.

III.10.H.2.c Allowable Waste Feed During the Shakedown Period

III.10.H.2.c.i The Permittees may feed the dangerous waste specified for the LAW Vitrification System on the Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those wastes outside the waste acceptance criteria specified in the WAP, Attachment 1, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., except Permit Conditions III.10.H.2.c.ii. through v. also apply.

III.10.H.2.c.ii The Permittees will not feed the following wastes to the LAW Vitrification System during Shakedown Phase 1:

A. Acutely toxic dangerous waste listed in WAC 173-303-081(a)(2)(a)(i).

B. Mixed waste

III.10.H.2.c.iii The Permittees will not feed the following waste to the LAW Vitrification System during Shakedown Phase 2:

A. Mixed waste

III.10.H.2.c.iv The feed-rates to the LAW Vitrification System will not exceed the limits in Permit Tables III.10.H.D and III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5.

III.10.H.2.c.v The Permittees will conduct sufficient analysis of the dangerous waste treated in the LAW Vitrification System to verify that the waste feed is within the physical and chemical composition limits specified in this Permit.

III.10.H.3 **Demonstration Test Period [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].**

III.10.H.3.a Demonstration Test Period

III.10.H.3.a.i The Permittees will operate, monitor, and maintain the LAW Vitrification System as specified in Permit Condition III.10.H.1., and Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., except as modified in accordance with Permit Conditions III.10.H.1.b.xii., and III.10.H.3.

III.10.H.3.a.ii Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., will be resubmitted to Ecology for approval by the Permittees as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. at least one hundred and eighty (180) days prior to the start date of the demonstration test. The revised Demonstration Test Plan will include applicable EPA promulgated test methods and procedures in effect at the time of the re-submittal and projected commencement and completion dates for the Demonstration Test.

III.10.H.3.a.iii The Permittees will not commence the demonstration test period until documentation has been submitted to Ecology verifying that the LAW Vitrification System has operated at a minimum of 75% of the demonstration test period feed-rate limit for a minimum of an eight (8) consecutive hours period on two (2) consecutive days.

III.10.H.3.b Performance Standards

The Permittees will demonstrate compliance with the performance standards specified in Permit Condition III.10.H.1.b. during the Demonstration Test Period.

III.10.H.3.c Allowable Waste Feed During the Demonstration Test Period

III.10.H.3.c.i The Permittees may feed the dangerous waste specified for the LAW Vitrification System in Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those waste outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., except Permit Conditions III.10.H.3.c.ii. through iv. also apply.

III.10.H.3.c.ii The Permittees will not feed mixed waste to the LAW Vitrification System.

III.10.H.3.c.iii The dangerous waste feed-rates to the LAW Vitrification System will not exceed the limits in Permit Tables III.10.H.D and F, as approved/modified pursuant to Permit Condition III.10.H.5.

III.10.H.3.c.iv The Permittees will conduct sufficient analysis of the dangerous waste treated in the LAW Vitrification System to verify that the dangerous waste is within the physical and chemical composition limits specified in this Permit.

III.10.H.3.d Demonstration Data Submissions and Certifications

III.10.H.3.d.i The Permittees will submit to Ecology a complete demonstration test report within one-hundred eighty (180) calendar days of completion of the Demonstration Test including all data collected during the Demonstration Test and updated Permit Tables III.10.I.D, III.10.I.E and III.10.I.F.

III.10.H.3.d.ii The Permittees must submit the following information to Ecology prior to receiving Ecology's approval to commence feed of dangerous waste and mixed waste to the LAW Vitrification System:

A. The Permittees will submit a summary of data collected as required by the Demonstration Test Plan to Ecology upon completion of the Demonstration Test.

B. A certification that the Demonstration Test has been carried out in accordance with the approved Demonstration Test Plan and approved modifications within thirty (30) days of the completion of the Demonstration Test [WAC 173-303-807(8)].

C. Calculations and analytical data showing compliance with the performance standards specified in Permit Conditions III.10.H.1.b.i, III.10.H.1.b.iv, III.10.H.1.b.v, III.10.H.1.b.vi, and III.10.H.1.b.vii

D. Laboratory data QA/QC summary for the information provided in III.10.H.3.d.ii.C.

III.10.H.3.d.iii After successful completion of the Demonstration Test and receipt of Ecology's approval, the Permittees will be authorized to commence feed of dangerous waste and mixed waste to the LAW Vitrification System for the post-demonstration test period indicated in Permit Tables III.10.H.D and F, as approved/modified pursuant to Permit Condition III.10.H.5., in compliance with the operating requirements specified in Permit Condition III.10.H.1.c. and within the limitations specified in Permit Condition.III.10.C.14.

III.10.H.3.d.iv RESERVED

III.10.H.3.d.v After successful completion of the Demonstration Test, Permittees submittal of the following to Ecology and the Permittees receipt of approval of the following in writing, the Permittees will be authorized to feed dangerous waste and mixed waste to the LAW Vitrification System pursuant to Permit Section III.10.I.

A. A complete Demonstration Test Report for the LAW Vitrification System and updated Permit Tables III.10.I.D, III.10.I.E, and III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.C.11.c or III.10.C.11.d. The test report will be certified in accordance with WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

B. A Final Risk Assessment Report completed pursuant to Permit Conditions III.10.C.11.c. or III.10.C.11.d.

III.10.H.3.d.vi If any calculations or testing results show that one or more of the performance standards listed in Permit Condition III.10.H.1.b., with the exception of Permit Condition III.10.H.1.b.x., for the LAW Vitrification System were not met during the Demonstration Test, the Permittees will perform the following actions:

A. Immediately stop dangerous and mixed waste feed to the LAW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).

B. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s) as specified in Permit Condition I.E.21.

C. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).

D. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s), documentation supporting a mode of operation where all performance standards listed in Permit Condition III.10.H.1.b., with the exception of Permit Condition III.10.H.1.b.x., for the LAW Vitrification System were met during the demonstration test, if any such mode was demonstrated.

E. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.H.3.d.vi.A through D above, and any additional information, Ecology may provide in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of a compliance schedule and/or revised Demonstration Test Plan pursuant to Permit Conditions III.10.H.3.d.vi.F and G.

F. If the performance standard listed in Permit Condition III.10.H.1.b.i. was not met during the Demonstration Test, the Permittees will submit within one hundred and twenty (120) days of discovery of not meeting the performance standard, a revised Demonstration Test Plan (if appropriate), and a compliance schedule for Ecology approval to address this deficiency. If a revised Demonstration Test Plan is submitted, it will be accompanied by a request for approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. The revised Demonstration Test Plan (if submitted) must include substantive changes to prevent failure from reoccurring.

G. If any of the performance standards listed in Permit Condition III.10.H.1.b., with the exception of Permit Conditions III.10.H.1.b.i. or III.10.H.1.b.x., were not met during the Demonstration Test the Permittees will submit to Ecology within one hundred twenty (120) days of discovery of not meeting the performance standard(s), a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

III.10.H.3.d.vii If any calculations or testing results show that any emission rate for any constituent listed in Permit Table III.10.H.E, as approved pursuant to Permit Condition III.10.C.11.b., is exceeded for LAW Vitrification System during the Demonstration Test, the Permittees will perform the following actions:

A. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.

B. Submit to Ecology additional risk information to indicate that the increased emissions impact is offset by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of exceeding the emission rate(s); and

C. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

III.10.H.4 Post Demonstration Test Period [WAC 173-303-670(5), WAC 173-303-670(6), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.4.a The Permittees will operate, monitor, and maintain the LAW Vitrification System as specified in Permit Condition III.10.H.1. and Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5., except as modified in accordance with Permit Conditions III.10.H.1.b.xii., III.10.H.3., and III.10.H.4.

III.10.H.4.b Allowable Waste Feed During the Post-Demonstration Test Period

III.10.H.4.b.i The Permittees may feed the dangerous and/or mixed waste specified for the LAW Vitrification System on the Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those wastes outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., and except Permit Conditions III.10.H.4.b.ii. and III.10.H.4.b.iii. also apply.

III.10.H.4.b.ii The dangerous waste and mixed waste feed-rates to the LAW Vitrification System will not exceed the limits in Permit Tables III.10.H.D and F, as approved/modified pursuant to Permit Condition III.10.H.5., or in Permit Condition III.10.H.3

III.10.H.4.b.iii The Permittees will conduct sufficient analysis of the dangerous waste and mixed waste treated in LAW Vitrification System to verify that the waste feed is within the physical and chemical composition limits specified in this Permit.

III.10.H.5 Compliance Schedules

III.10.H.5.a All information identified for submittal to Ecology in a. through f. of this compliance schedule must be signed and certified in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.H.1.a.iii. [WAC 173-303-806(4)].

III.10.H.5.b The Permittees will submit to Ecology, pursuant to Permit Condition III. 10.C.9.f., prior to construction of each secondary containment and leak detection system for the LAW Vitrification System (per level) as identified in Permit Tables III.10.H.A and III.10.H.B, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 9.2 , 9.4, 9.5, 9.7, 9.8, 9.9, 9.11, and 9.12 of this Permit. At a minimum, engineering information specified below will show the following as described in WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):

III.10.H.5.b.i IQRPE Reports (specific to foundation, secondary containment, and leak detection system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 9.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. IQRPE Reports will be consistent with the information separately provided in ii. through ix. below [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.H.5.b.ii Design drawings (General Arrangement Drawings, in plan) and specifications for the foundation, secondary containment including liner installation details, and leak detection methodology. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f) and WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.H.5.b.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the secondary containment system. This information will demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [WAC 173-303-640(4)(c)(ii), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.b.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.b.v Secondary containment/foundation, and leak detection system, materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials) as applicable [WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.b.vi Detailed description of how the secondary containment for the LAW Vitrification System will be installed in compliance with WAC 173-303-640(3)(c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B);

III.10.H.5.b.vii Submit Permit Tables III.10.H.B and III.10.I.B completed to provide for all secondary containment sumps and floor drains the information as specified in each column heading consistent with information to be provided in i. through vi., above;

III.10.H.5.b.viii Documentation that secondary containment and leak detection systems will not accumulate hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.b.ix A detailed description of how LAW Vitrification System design provides access for conducting future LAW Vitrification System integrity assessments [WAC 173-303-640(3)(b) and WAC 173-303-806(4)(i)(i)(B)].

III.10.H.5.c The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f, prior to installation of each sub-system as identified in Permit Table III.10.H.A, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 9.1 through 9.14, and 9.17 of this Permit. At a minimum, engineering information specified below will show the following, as required pursuant to WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.H.5.c.i IQRPE Reports (specific to sub-system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 9.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information separately provided in ii. through xii. below, and the

IQRPE Report specified in Permit Condition III.10.H.5.b. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.H.5.c.ii Design drawings [General Arrangement Drawings in plan and, Process Flow Diagrams, Piping and Instrumentation Diagrams (including pressure control systems), Mechanical Drawings, and specifications, and other information specific to subsystems (to show location and physical attributes of each subsystem)] [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.H.5.c.iii Sub-system design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details to support the subsystems. Structural support calculations specific to off-specification, non-standard and field fabricated subsystems will be submitted for incorporation into the Administrative Record. Documentation will include but not limited to, supporting specifications, test data, treatment effectiveness report, etc. supporting projected operational capability (e.g., WESP projected removal efficiency for individual metals, halogens, particulates, etc.) and compliance with performance standards specified in Permit Condition III.10.H.1.b [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.c.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.c.v Sub-system materials selection documentation (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.H.5.c.vi Sub-system vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.c.vii System descriptions related to sub-system units will be submitted for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.c.viii Mass and energy balance for normal projected operating conditions used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.c.ix Detailed description of all potential LAW Vitrification System bypass events including:

A. A report which includes an analysis of credible potential bypass events and recommendations for prevention/minimization of the potential, impact, and frequency of the bypass event to include at a minimum:

1. Operating procedures

2. Maintenance procedures
3. Redundant equipment
4. Redundant instrumentation
5. Alternate equipment
6. Alternate materials of construction

III.10.H.5.c.x A detailed description of how the sub-systems will be installed in compliance with WAC 173-303-640(3)(c), (d), and (e), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.H.5.c.xi Sub-system design to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW, for incorporation into the Administrative Record [WAC 173-303-640(5)(e), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.c.xii Documentation that sub-systems are designed to prevent the accumulation of hydrogen gases levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)].

III.10.H.5.d The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f, prior to installation of equipment for each sub-system as identified in Permit Tables III.10.H.A and III.10.H.B, not addressed in Permit Conditions III.10.H.5.b. or III.10.H.5.c., engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 9.1 through 9.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.H.5.d.i IQRPE Reports (specific to sub-system equipment) will include a review of design drawings, calculations, and other information as applicable on which the certification report is based. The reports will include, but not be limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 9.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information provided separately in ii. through xiii. below and the IQRPE Reports specified in Permit Conditions III.10.H.5.b. and III.10.H.5.c. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.d.ii Design drawings [Process Flow Diagrams, Piping and Instrumentation Diagrams (including pressure control systems), specifications and other information specific to equipment (these drawings should include all equipment such as pipes, valves, fittings, pumps, instruments, etc.)] [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.d.iii Sub-system equipment design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the sub-system equipment [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(f), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.d.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil and water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.H.5.d.v Materials selection documentation for equipment for each sub-system (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.H.5.d.vi Vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, for sub-system equipment will be submitted for incorporation into the Administrative Record. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(iv)];

III.10.H.5.d.vii Sub-system, sub-system equipment, and leak detection system instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)].

III.10.H.5.d.viii System description related to sub-system equipment, and system descriptions related to leak detection systems, for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.d.ix A detailed description of how the sub-system equipment will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.d.x For process monitoring, control, and leak detection system instrumentation for the LAW Vitrification System as identified in Permit Tables III.10.H.C. and III.10.H. F., a detailed description of how the process monitoring, control, and leak detection system instrumentation, will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), WAC 173-303-806(4)(c)(vi), and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.d.xi Mass and energy balance for projected normal operating conditions used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified, for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.d.xii Documentation that sub-systems equipment are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.d.xiii Leak detection system documentation (e.g. vendor information, etc.) consistent with information submitted under Permit Condition III.10.H.5.c.ii. and Permit Conditions III.10.H.5.d.ii., vii., viii., and x. above, will be submitted for incorporation into the Administrative Record.

III.10.H.5.e Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following as specified below for incorporation into Operating Unit Group 10, Appendix 9.18 of this

Permit, except Permit Condition III.10.H.5.e.i., which will be incorporated into Operating Unit Group 10, Addendum E of this Permit. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.H.5.b., c., d., e., and f., III.10.C.3.e. and III.10.C.11.b., as approved by Ecology:

III.10.H.5.e.i Integrity assessment program and schedule for the LAW Vitrification System will address the conducting of periodic integrity assessments on the LAW Vitrification System over the life of the system, as specified in Permit Condition III.10.H.5.b.ix. and WAC 173-303-640(3)(b), in accordance with WAC 173-303-680, and descriptions of procedures for addressing problems detected during integrity assessments. The schedule must be based on past integrity assessments, age of the system, materials of construction, characteristics of the waste, and any other relevant factors [WAC 173-303-640(3)(b), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)].

III.10.H.5.e.ii Detailed plans and descriptions, demonstrating the leak detection system is operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous and/or mixed waste or accumulated liquid in the secondary containment system within twenty-four (24) hours [WAC 173-303-640(4)(c)(iii)]. Detection of a leak of at least 0.1 gallons per hour within twenty-four (24) hours is defined as being able to detect a leak within twenty-four (24) hours. Any exceptions to this criteria must be approved by Ecology in accordance with WAC 173-303-680, WAC 173-303-640(4)(c)(iii), and WAC 173-303-806(4)(i)(i)(b).

A. Dangerous waste pipe penetrations that require a penetration seal in accordance with the International Building Code (IBC) and DOE-STD-1066, DOE Standard for Fire Protection Design Criteria, or meet ventilation sealing requirements identified in Table III.10.H.G, are not required to meet the 0.1 gallons per hour within twenty-four (24) hours leak detection rate for those sections of piping that are in contact with approved silicone or equivalent low-permeability seal material.

B. Piping on either side of the penetration seal must meet the requirements of III.10.H.5.e.ii.

C. Revisions (including additions or deletions) to Table III.10.H.G will be submitted to Ecology for review and approval pursuant to Conditions III.10.C.2.e and III.10.C.2.f. Addition of penetration seal locations to Table III.10.H.G. will be approved by Ecology prior to installation of the penetration seal.

Table III.10.H.G LAW Plant Penetration Seal Location

Row Number	Room Number	Orientation	Discipline	Sequence Number
1.	L0000112	E	PD	02097
2.	L0000123	E	PD	01823
3.	L0000123	E	PD	01834
4.	L0000123	E	PD	01828
5.	L0000123	E	PD	01837
6.	L0000123	E	PD	01822
7.	L0000123	E	PD	01824
8.	L0000123	E	PD	01826

Row Number	Room Number	Orientation	Discipline	Sequence Number
9.	L0000123	E	PD	01821
10.	L0000123	E	PD	01825
11.	L0000123	E	PD	01827
12.	L0000123	E	PD	01836
13.	L0000123	E	PD	01820
14.	L0000123	E	PD	01832
15.	L0000123	S	PD	01797
16.	L0000124	E	PD	01843
17.	L0000124	E	PD	01844
18.	L0000124	E	PD	01845
19.	L0000124	E	PD	01842
20.	L0000124	E	PD	01847
21.	L0000124	E	PD	01841
22.	L0000124	E	PD	01846
23.	L0000124	E	PD	01850
24.	L0000124	E	PD	01848
25.	L0000124	E	PD	01852
26.	L0000124	E	PD	01840
27.	L0000124	E	PD	01839
28.	L0000124	E	PD	01849
29.	L0000124	S	PD	01801
30.	L0000125	E	PD	01858
31.	L0000125	E	PD	01859
32.	L0000125	E	PD	01860
33.	L0000125	E	PD	01857
34.	L0000125	E	PD	01862
35.	L0000125	E	PD	01856
36.	L0000125	E	PD	01861
37.	L0000125	E	PD	01865
38.	L0000125	E	PD	01863
39.	L0000125	E	PD	01867
40.	L0000125	E	PD	01855
41.	L0000125	E	PD	01854
42.	L0000125	E	PD	01864
43.	L0000126	S	PD	01807
44.	L0000201	F	PD	02405
45.	L0000201	S	PD	02406
46.	L0000202	F	PD	02495
47.	L0000216	W	PD	02674

Row Number	Room Number	Orientation	Discipline	Sequence Number
48.	L0000220	E	PD	02709
49.	L0000301	F	PD	03319
50.	L0000301	S	PD	03437
51.	L0000301	S	PD	04149
52.	L0000301	S	PD	04141
53.	L000101A	F	PD	01291
54.	L000101A	F	PD	01292
55.	L000101A	W	PD	01971
56.	L000226B	F	PD	02445
57.	L000226B	F	PD	02444
58.	L000304F	F	PD	03278
59.	L000304F	F	PD	03277
60.	LB00001B	E	EQ	80908
61.	LB00001B	S	PD	00196
62.	LB00001B	S	PD	00201
63.	LC000201	F	PD	02430

III.10.H.5.e.iii Detailed operational plans and descriptions, demonstrating that spilled or leaked waste and accumulated liquids can be removed from the secondary containment system within twenty-four (24) hours [WAC 173-303-806(4)(i)(i)(B)].

III.10.H.5.e.iv Descriptions of operational procedures demonstrating appropriate controls and practices are in place to prevent spills and overflows from the LAW Vitrification System or containment systems in compliance with WAC 173-303-640(5)(b)(i) through (iii), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.H.5.e.v Description of procedures for investigation and repair of the LAW Vitrification System [WAC 173-303–640(6) and WAC 173-303-640(7)(e) and (f), in accordance with WAC 173-303-680, WAC 173-303-320, WAC 173-303-806(4)(a)(v), and WAC 173-303-806(4)(a)(ii)(B)].

III.10.H.5.e.vi Updated Addendum C, Narrative Description, Tables and Figures as identified in Permit Tables III.10.H.A and III.10.H.B, as modified pursuant to Permit Condition III.10.H.5.e.x. and updated to identify routinely non-accessible LAW Vitrification sub-systems.

III.10.H.5.e.vii Description of procedures for management of ignitable and reactive, and incompatible dangerous and/or mixed waste as specified in WAC 173-303-640(9) and (10), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B).

III.10.H.5.e.viii A description of the tracking system used to track dangerous and/or mixed waste generated throughout the LAW Vitrification system, pursuant to WAC 173-303-380.

III.10.H.5.e.ix Permit Tables III.10.H.C and III.10.I.C will be completed for LAW Vitrification System process and leak detection system monitors and instruments (to include, but not be limited to: instruments and monitors measuring and/or controlling flow, pressure, temperature, density, pH, level, humidity, and emissions) to provide the information as specified in each column heading. Process and leak detection system monitors and instruments for critical systems as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b., and for operating parameters as required to comply with Permit Condition III.10.C.3.e.iii. will be addressed. Process monitors and instruments for non-waste management operations (e.g., utilities, raw chemical storage, non-contact cooling waters, etc.) are excluded from this permit condition [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.e.x Permit Tables III.10.H.A and III.10.I.A amended as follows [WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)]:

A. Under column 1, update and complete list of dangerous and mixed waste LAW Vitrification System sub-systems, including plant items that comprise each system (listed by item number).

B. Under column 2, update and complete system designations.

C. Under column 3, replace the 'Reserved' with Operating Unit Group 10, Appendix 9.0 subsections (e.g., 9.1, 9.2, etc.) designated in Permit Conditions III.10.H.5.b., c., and d. specific to LAW Vitrification System sub-system as listed in column 1.

D. Under column 4, update and complete list of narrative description, tables, and figures.

III.10.H.5.f One hundred and eighty (180) days prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit for review and receive approval for incorporation into Operating Unit Group 10, Appendix 9.15 of this Permit, a Demonstration Test Plan for the LAW Vitrification System to demonstrate that the LAW Vitrification Systems meets the performance standards specified in Permit Condition III.10.H.1.b. In order to incorporate the Demonstration Test Plan for the LAW Vitrification System into Operating Unit Group 10, Appendix 9.15, Permit Condition III.10.C.2.g. process will be followed. The Demonstration Test Plan will include, but not be limited to, the following information. The Demonstration Test Plan will also be consistent with the information provided pursuant to Permit Conditions III.10.H.5.b., c., d., and e., III.10.C.3.e., and III.10.C.11.b., as approved by Ecology and consistent with the schedule described in Operating Unit Group 10, Appendix 1.0 of this Permit. The documentation required pursuant to Permit Condition III.10.H.5.f.x., in addition to being incorporated into Operating Unit Group 10, Appendix 9.15, will be incorporated by reference in Operating Unit Group 10, Addendum E of this Permit.

Notes: (1) The following should be consulted to prepare this Demonstration Test Plan: "Guidance on Setting Permit Conditions and Reporting Trial Burn Results Volume II of the Hazardous Waste Incineration Guidance Series," (EPA/625/6-89/019) and Risk Burn Guidance For Hazardous Waste Combustion Facilities," (EPA-R-01-001, July 2001), WAC 173-303-807(2), WAC 173-303-670(5), WAC-173-303-670(6), 40 CFR §63.1207(f)(2), 40 CFR §63.1209, and Appendix to 40 CFR Part 63 EEE.

(2) Cross-referencing to the information provided pursuant to permit Conditions III.H.5.b., c., d., e., and III.10.C.3.e.v., as approved by Ecology, that are redundant to elements of the Demonstration Test Plan for the LAW Vitrification System is acceptable.

III.10.H.5.f.i Analysis of each feed-stream to be fed during the demonstration test, including dangerous waste, glass formers and reductants, process streams (e.g., volumes of air leakage including control air, process air, steam, sparge bubbler air, air in-leakage from melter cave, and gases from LAW Vitrification Vessel Ventilation System, process water, etc.) that includes:

A. Levels of ash, metals, total chlorine (organic and inorganic), other halogens and radionuclide surrogates.

B. Description of the physical form of the feed-streams.

C. An identification and quantification of organics that are present in the feed-stream, including constituents proposed for DRE demonstration.

A comparison of the proposed demonstration test feed streams to the mixed waste feed envelopes to be processed in the melters must be provided that documents that the proposed demonstration test feed streams will serve as worst case surrogates for organic destruction, formation of products of incomplete oxidation, and metals, total chlorine (organic and inorganic), other halogens, particulate formation, and radionuclides.

III.10.H.5.f.ii Specification of trial principal organic dangerous constituents (PODCs) for which destruction and removal efficiencies are proposed to be calculated during the demonstration test and for inclusion in Permit Conditions III.10.H.1.b.i. and III.10.I.1.b.i. These trial PODCs will be specified based on destructibility, concentration or mass in the waste and the dangerous waste constituents or constituents in WAC 173-303-9905;

III.10.H.5.f.iii A description of the blending procedures, prior to introducing the feed-streams into the melter, including analysis of the materials prior to blending, and blending ratios;

III.10.H.5.f.iv A description of how the surrogate feeds are to be introduced for the demonstration. This description should clearly identify the differences and justify how any of differences would impact the surrogate feed introduction as representative of how mixed waste feeds will be introduced;

III.10.H.5.f.v A detailed engineering description of the LAW Vitrification System, including:

A. Manufacturer's name and model number for each sub-system.

B. Design capacity of each sub-system including documentation (engineering calculations, manufacturer/vendor specifications, operating data, etc.) supporting projected operational efficiencies (e.g., WESP projected removal efficiency for individual metals, halogens, particulates, etc.) and compliance with performance standards specified in Permit Condition III.10.H.1.b.

C. Detailed scaled engineering drawings, including Process Flow Diagrams, Piping and Instrumentation Diagrams, Vessel Drawings (plan, and elevation with cross sections) and General Arrangement Drawings.

D. Process Engineering Descriptions.

E. Mass and energy balance for each projected operating condition and each demonstration test condition, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified for incorporation into the Administrative Record.

F. Engineering Specifications/data sheets (materials of construction, physical and chemical tolerances of equipment, and fan curves).

G. Detailed Description of Automatic Waste Feed Cutoff System addressing critical operating parameters for all performance standards specified in Permit Condition III.10.H.1.b.

H. Documentation to support compliance with performance standards specified in Permit Condition III.10.H.1.b., including engineering calculations, test data, and manufacturer/vendor's warranties, etc..

I. Detailed description of the design, operation, and maintenance practices for air pollution control system.

J. Detailed description of the design, operation, and maintenance practices of any stack gas monitoring and pollution control monitoring system.

III.10.H.5.f.vi Detailed description of sampling and monitoring procedures including sampling and monitoring locations in the system, the equipment to be used, sampling and monitoring frequency, and planned analytical procedures for sample analysis including, but not limited to:

A. A short summary narrative description of each stack sample method should be included within the main body of the demonstration test plan, which references an appendix to the plan that would include for each sampling train: (1) detailed sample method procedures, (2) sampling train configuration schematic, (3) sampling recovery flow sheet, (4) detailed analytical method procedures, and (5) sampling preparation and analysis flow sheet. The detailed procedures should clearly flag where the method has provided decision points (e.g., choices of equipment materials of construction, choices of clean-up procedures or whether additional clean-up procedures will be incorporated, whether pretest surveys or laboratory validation work will be performed, enhancements to train to accommodate high moisture content in stack gas, etc.) and what is being proposed along with the basis for the decision.

B. A short summary narrative description of the feed and residue sampling methods should be included within the main body of the demonstration test plan, which references an appendix that would include for each sample type: (1) detailed sample method procedures, (2) sampling recovery/compositing procedures, and (3) detailed analytical method procedures. The detailed procedures should clearly flag where the method has provided decision points (e.g., choices of equipment materials of construction, choices of clean-up procedures or whether additional clean-up procedures will be incorporated, whether pretest surveys or laboratory validation work will be performed, etc.) and what is being proposed along with the basis for the decision.

III.10.H.5.f.vii A detailed test schedule for each condition for which the demonstration test is planned, including projected date(s), duration, quantity of dangerous waste to be fed, and other relevant factors.

III.10.H.5.f.viii A detailed test protocol including, for each test condition, the ranges of feed-rate for each feed system, and all other relevant parameters that may affect the ability of the LAW Vitrification System to meet performance standards specified in Permit Condition III.10.H.1.b.

III.10.H.5.f.ix A detailed description of planned operating conditions for each demonstration test condition, including operating conditions for shakedown, demonstration test, post-demonstration test and normal operations. This information will also include submittal of Permit Tables III.10.H.D, III.10.H.F, III.10.I.D, and III.10.I.F completed with the information as specified in each column heading for each LAW Vitrification System waste feed cutoff parameter and submittal of supporting documentation for Permit Tables III.10.H.D, III.10.H.F, III.10.I.D, and III.10.I.F set-point values.

III.10.H.5.f.x The test conditions proposed must demonstrate meeting the performance standards specified in Permit Condition III.10.H.1.b. with the simultaneous operation of both melters at capacity and input from the LAW Vitrification Vessel Ventilation System at capacity to simulate maximum loading to the LAW Vitrification System off-gas treatment system and to establish the corresponding operating parameter ranges. To the extent that operation of one (1) melter or two (2) melters cannot be sustained within the operating parameter range established at this maximum load, additional demonstration test conditions must be included in the plan and performed to establish operating parameter ranges for each proposed operating mode while demonstrating meeting the performance standards specified in Permit Condition III.10.H.1.b..

III.10.H.5.f.xi Detailed description of procedures for start-up and shutdown of waste feed and controlling emissions in the event of an equipment malfunction, including off-normal and emergency shutdown procedures.

III.10.H.5.f.xii A calculation of waste residence time.

III.10.H.5.f.xiii Any request to extrapolate metal feed-rate limits from Demonstration Test levels must include:

A. A description of the extrapolation methodology and rationale for how the approach ensures compliance with the performance standards as specified in Permit Condition III.10.H.1.b.

B. Documentation of the historical range of normal metal feed-rates for each feed stream.

C. Documentation that the level of spiking recommended during the demonstration test will mask sampling and analysis imprecision and inaccuracy to the extent that extrapolation of feed-rates and emission rates from the Demonstration Test data will be as accurate and precise as if full spiking were used.

III.10.H.5.f.xiv Documentation of the expected levels of constituents in LAW Vitrification System input streams including, but not limited to, waste feed, glass former and reactants, control air, process air, steam, sparge bubbler air, air in-Leakage from melter cave, gases from LAW Vitrification Vessel Ventilation System, and process water.

III.10.H.5.f.xv Documentation justifying the duration of the conditioning required to ensure the LAW Vitrification System had achieved steady-state operations under Demonstration Test operating conditions.

III.10.H.5.f.xvi Documentation of LAW Vitrification System process and leak detection system instruments and monitors as listed on Permit Tables III.10.H.C, III.10.H.F, III.10.I.C, and III.10.I.F to include:

A. Procurement specifications.

B. Location used.

C. Range, precision, and accuracy.

D. Detailed descriptions of calibration/functionality test procedures (either method number ASTM) or provide a copy of manufacturer's recommended calibration procedures.

E. Calibration/functionality test, inspection, and routine maintenance schedules and checklists, including justification for calibration, inspection and maintenance frequencies, criteria for identifying instruments found to be significantly out of calibration, and corrective action to be taken for instruments found to be significantly out of calibration (e.g., increasing frequency of calibration, instrument replacement, etc.).

F. Equipment instrument control logic narrative description (e.g., descriptions of failsafe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)].

III.10.H.5.f.xvii Outline of demonstration test report.

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
<u>LAW Melter Process System</u> LMP-MLTR-00001 (LAW Melter 1) LMP-MLTR-00002 (LAW Melter 2)	LMP	**<u>24590-LAW</u>** -M6-LMP-00001001, Rev 0 -M6-LMP-00002001, Rev 0 -M6-LMP-00002002, Rev 0 -M6-LMP-00031001, Rev 0 -M6-LMP-00032001, Rev 0 -M6-LMP-00032002, Rev 0 -P1-P01T-00002, Rev 7	Section 4.1.3.2, Table C-8, and Figures C1-1, C1-3 and C1-21 in Operating Unit Group 10, Addendum C of this Permit.
<u>LAW Primary Offgas Process System</u> LOP-FCLR-00001 (Melter 1 Primary Film Cooler) LOP-FCLR-00002 (Melter 1Standby Film Cooler No. 2) LOP-FCLR-00003 (Melter 2 Primary Film Cooler) LOP-FCLR-00004 (Melter 2 Standby Film Cooler)	LOP	**<u>24590-LAW</u>** -P1-P01T-00002, Rev 7 -M6-LOP-00004001, Rev 0 -M6-LOP-00004002, Rev 0 -M6-LOP-00005001, Rev 0 -M6-LOP-00005002, Rev 0	Section 4.1.3.3, Table C-8, and Figures C1-1, C1-3 and C1-21 in Operating Unit Group 10, Addendum C of this Permit.
<u>LAW Primary Offgas Process System (Cont.)</u> LOP-SCB-00001 (Melter 1 Submerged Bed Scrubber) LOP-SCB-00002 (Melter 2 Submergered Bed Scrubber)	LOP	**<u>24590-LAW</u>** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0 -M6-LOP-00001001, Rev 0 -M6-LOP-00002001, Rev 0 -MK-LOP-P0001001, Rev 0 -MK-LOP-P0001002, Rev 0 -MK-LOP-P0001003, Rev 0 -MKD-LOP-P0008, Rev 0	Section 4.1.3.3, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
		-NID-LOP-P0001, Rev 1 -P1-P01T-00002, Rev 7	
LAW Primary Offgas Process System (Cont.) LOP-WESP-00001 (Melter 1 Wet Electrostatic Precipitator - WESP) LOP-WESP-00002 (Melter 2 Wet Electrostatic Precipitator -WESP)	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0 -M6-LOP-00001004, Rev 0 -M6-LOP-00002004, Rev 0 -NID-LOP-00003, Rev 3 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-MKE0-T0001, Rev 5	Section 4.1.3.3, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System LVP-HEPA-00001A (Melter Offgas HEPA Filter) LVP-HEPA-00001B (Melter Offgas HEPA Filter) LVP-HEPA-00002A (Melter Offgas HEPA Filter) LVP-HEPA-00002B (Melter Offgas HEPA Filter) LVP-HEPA-00003A (Melter Offgas HEPA Filter)	LVP	**24590-LAW** -M5-V17T-00010, Rev 4 -M6-LVP-00001003, Rev 0 -P1-P01T-00005, Rev 6	Section 4.1.3.3, Table C-8, Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.)	LVP	**24590-LAW** -M6-LVP-00005002, Rev 3	Section 4.1.3.3, Table C-8, Figures C1-1 and

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
LVP-SCO-00001 (Thermal Catalytic Oxidizer – located on LVP-SKID-00002)			C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-SCR-00001 (NOx Selective Catalytic Reduction Unit – located on LVP-SKID-00002) LVP-HX-00001 (Catalytic Oxidizer Heat Exchanger – located on LVP-SKID-00002) LVP-HTR-00002 (Catalytic Oxidizer Electric Heater – located on LVP-SKID-00002)	LVP	**24590-LAW** -M6-LVP-00005002, Rev 3	Section 4.1.3.3, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-ADBR-00001A (Offgas Mercury Adsorber – located on LVP-SKID-00001) LVP-ADBR-00001B (Offgas Mercury Adsorber – located on LVP-SKID-00001)	LVP	**24590-LAW** -M5-V17T-00011, Rev 5 -M6-LVP-00004003, Rev 0 -P1-P01T-00005, Rev 6	Section 4.1.3.3, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-SCB-00001 (Melter Offgas Caustic Scrubber)	LVP	**24590-LAW** -P1-P01T-00005, Rev 6 -M6-LVP-00002002, Rev 0	Section 4.1.3.3, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-HTR-00001A (Melter Offgas HEPA Preheater) LVP-HTR-00001B (Melter Offgas HEPA Preheater)	LVP	**24590-LAW** -M5-V17T-00010, Rev 4 -M6-LVP-00001002, Rev 0 -P1-P01T-00005, Rev. 6	Section 4.1.3.3, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-EXHR-00001A (Melter Offgas Exhauster) LVP-EXHR-00001B (Melter Offgas Exhauster) LVP-EXHR-00001C (Melter Offgas Exhauster)	LVP	**24590-LAW** -M5-V17T-00010, Rev 4 -M6-LVP-00001004, Rev 0 -M6-LVP-00001005, Rev 0 -M6-LVP-00001006, Rev 0 -P1-P01T-00005, Rev 6	Section 4.1.3.3, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.H.B - LAW Vitrification Miscellaneous Unit System Secondary Containment Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[a] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specification Nos., etc.)
RLD-SUMP-00029 L-0123 (Process Cell, El. +3')	37	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002 -P1-P01T-00002
RLD-SUMP-00030 L-0123 (Process Cell, El. +3')	37	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002 -P1-P01T-00002
RLD-SUMP-00031 L-0124 (Process Cell Sump, El. +3')	37	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002 -P1-P01T-00002
RLD-SUMP-00032 L-0124 (Process Cell, El. +3')	37	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002 -P1-P01T-00002
LOP-FD-00001 L-0123 (LOP-BULGE-00001 Drain El. +3')	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-00001003
RLD-WS-20037-S11B-01 L-0123 (Melter 1 Encasement Assembly Drain, El. +3')	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00012001
LOP-FD-00002 L-0124 (LOP-BULGE-00002 Drain, El. +3')	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-00002003
RLD-WS-20033-S11B-01 L-0124 (Melter 2 Encasement Assembly Drain, El. +3')	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00042001
RLD-FD-00025 L-0304F (Curb Floor Drain for Caustic Scrubber, El. 48')	N/A	4" Dia. 316L	**24590-LAW** -M6-RLD-00003001

Table III.10.H.B - LAW Vitrification Miscellaneous Unit System Secondary Containment Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[a] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specification Nos., etc.)
[a]Dimensions listed are based on permitted design. Actual dimensions may vary within acceptable design tolerances.			

Table III.10.H.C - LAW Vitrification System Process and Leak Detection System Instruments and Parameters

Sub-system Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Failure State	Expected Range	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-LAW-M6-LMP-00005001	Melter 1 Plenum Temperature Average	Temperature Element	TE-1267C, 1272C, 1280C	TBD	TBD	TBD	TBD	TBD
		Temperature Transmitter	TT-1267B					
		Temperature Indicator	TI-1267C, 1272C, 1280C					
24590-LAW-M6-LMP-00035001	Melter 2 Plenum Temperature Average	Temperature Element	TE-2267C, 2272C, 2280C	TBD	TBD	TBD	TBD	TBD
		Temperature Transmitter	TT-2267B					
		Temperature Indicator	TI-2267C, 2272C, 2280C					

24590-LAW-M6-LMP-00002002	Melter 1 Glass Pool Density	Density Transmitter	DT-1404	TBD	TBD	TBD	TBD	TBD
		Density Indicator	DI-1404					
24590-LAW-M6-LMP-00032002	Melter 2 Glass Pool Density	Density Transmitter	DT-2404	TBD	TBD	TBD	TBD	TBD
		Density Indicator	DI-2404					
24590-LAW-M6-LMP-00002002	Melter 1 Glass Pool Level	Level Transmitter	LT-1405	TBD	TBD	TBD	TBD	TBD
		Level Indicator	LI-1405					
24590-LAW-M6-LMP-00032002	Melter 2 Glass Pool Level	Level Transmitter	LT-2405	TBD	TBD	TBD	TBD	TBD
		Level Indicator	LI-2405					
24590-LAW-M6-LMP-00002002	Melter 1 Plenum Pressure	Pressure Differential Transmitter	PDT-1410 / PDI-1410* or	TBD	TBD	TBD	TBD	TBD
		Pressure Differential Indicator	PDT-1411 / PDI-1411*					
24590-LAW-M6-LMP-00032002	Melter 2 Plenum Pressure	Pressure Differential Transmitter	PDT-2410 / PDI-2410* or	TBD	TBD	TBD	TBD	TBD
		Pressure Differential Indicator	PDT-2411 / PDI-2411*					
		Level Element	LE-1466	TBD	TBD	TBD	TBD	TBD

24590-LAW-M6-LMP-00007002	Melter 1 West Canister Level	(IR Camera)						
		Level Transmitter	LT-1466					
		Level Indication	LI-1466B					
24590-LAW-M6-LMP-00007001	Melter 1 East Canister Level	Level Element (IR Camera)	LE-1511	TBD	TBD	TBD	TBD	TBD
		Level Transmitter	LT-1511					
		Level Indication	LI-1511B					
24590-LAW-M6-LMP-00037002	Melter 2 West Canister Level	Level Element (IR Camera)	LE-2466	TBD	TBD	TBD	TBD	TBD
		Level Transmitter	LT-2466					
		Level Indication	LI-2466B					
24590-LAW-M6-LMP-00037001	Melter 2 East Canister Level	Level Element (IR Camera)	LE-2511	TBD	TBD	TBD	TBD	TBD
		Level Transmitter	LT-2511					
		Level Indication	LI-2511B					
24590-LAW-M6-LMP-00010001	Melter 1 West Discharge Air Lift	On/Off Plug Valve	YV-1125	TBD	TBD	TBD	TBD	TBD
		Valve Control	YC-1125					
24590-LAW-M6-LMP-00008001	Melter 1 East Discharge Air Lift	On/Off Plug Valve	YV-1047	TBD	TBD	TBD	TBD	TBD
		Valve Control	YC-1047					

24590-LAW-M6-LMP-00040001	Melter 2 West Discharge Air Lift	On/Off Plug Valve	YV-2125	TBD	TBD	TBD	TBD	TBD
		Valve Control	YC-2125					
24590-LAW-M6-LMP-00038001	Melter 2 East Discharge Air Lift	On/Off Plug Valve	YV-2047	TBD	TBD	TBD	TBD	TBD
		Valve Control	YC-2047					
24590-LAW-M6-LMP-00012001	Melter 1 Feed Encasement Assembly Leak Detection	Cable Type Conductivity Element	LE-1632	TBD	TBD	TBD	TBD	TBD
			LAH 1632					
24590-LAW-M6-LMP-00042001	Melter 2 Feed Encasement Assembly Leak Detection	Cable Type Conductivity Element	LE-2632	TBD	TBD	TBD	TBD	TBD
			LAH-2632					
24590-LAW-M6-LMP-00013002 and 24590-LAW-M6-LMP-00005	Melter 1 Lid Cooling	Temperature Element	TE-1640	TBD	TBD	TBD	TBD	TBD
		Temperature Transmitter	TT-1293					
		Temperature Indicator	TI-1640					

24590-LAW-M6-LMP-00043 and 24590-LAW-M6-LMP-00035001	Melter 2 Lid Cooling	Temperature Element	TE-2640	TBD	TBD	TBD	TBD	TBD
		Temperature Transmitter	TT-2293					
		Temperature Indicator	TI-2640					
*These instrument sets are duplicates. Only one instrument set is required to remain functioning during waste feed operations.								

Table III.10.H.D - Maximum Feed-rates to LAW Vitrification System (RESERVED)

Description of Waste	Shakedown 1 and Post Demonstration Test	Shakedown 2 and Demonstration Test
Dangerous and Mixed Waste Feed-rate	RESERVED	RESERVED
Total Chlorine/Chloride Feed-rate	RESERVED	RESERVED
Total Metal Feed-rates	RESERVED	RESERVED
Total Ash Feed-rate	RESERVED	RESERVED

Table III.10.H.E - LAW Vitrification System Estimated Emission Rates (RESERVED)

Chemicals	CAS Number	Emission Rates (grams /second)
RESERVED	RESERVED	RESERVED

TABLE III.10.H.F - LAW Vitrification System Waste Feed Cutoff Parameters* 1 (RESERVED)

Sub-system Designation	Instrument Tag Number	Parameter Description	Setpoints During Shakedown 1 and Post Demonstration Test	Setpoints During Shakedown 2 and Demonstration Test
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

*A continuous monitoring system will be used as defined in Permit Section III.10.C.1.

[1]Maximum Feed-rate will be set based on not exceeding any of the constituent (e.g., ash, metals, and chlorine/chloride) feed limits specified on Table III.10.H.D. of this Permit.

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III.10.I LAW VITRIFICATION SYSTEM – LONG TERM MISCELLANEOUS THERMAL TREATMENT UNIT

For purposes of Permit Section III.10.I, where reference is made to WAC 173-303-640, the following substitutions apply: substitute the terms "LAW Vitrification System" for "tank system(s)," "sub-system(s)" for "tank(s)," "sub-system equipment" for "ancillary equipment," and "sub-system(s) or sub-system equipment of a LAW Vitrification System" for "component(s)," in accordance with WAC 173-303-680.

III.10.I.1 Requirements For LAW Vitrification System Beginning Normal Operation

Prior to commencing normal operations provided in Permit Section III.10.I, all requirements in Permit Section III.10.H will have been met by the Permittees and approved by Ecology, including the following: The LAW Vitrification System Demonstration Test results and the revised Final Risk Assessment provided for in Permit Condition III.10.C.11.c. or III.10.C.11.d. and Permit Section III.10.H, will have been evaluated and approved by Ecology, Permit Tables III.10.I.D and F, as approved/modified pursuant to Permit Condition III.10.H.5., will have been completed, submitted and approved pursuant to Permit Condition III.10.H.3.d.v. and Permit Table III.10.I.E, as approved/modified pursuant to Permit Condition III.10.H.5, will have been completed, submitted and approved pursuant to Permit Condition III.10.C.11.c. or d.

III.10.I.1.a Construction and Maintenance [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3) and WAC 173-303-340].

III.10.I.1.a.i The Permittees will maintain the design and construction of the LAW Vitrification System as specified in Permit Condition III.10.I.1., Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 9.1 through 9.17 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.a. through d. and III.10.H.5.f.

III.10.I.1.a.ii The Permittees will maintain the design and construction of all containment systems for the LAW Vitrification System, as specified in Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 9.2 and 9.4 through 9.14 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.a. through d.

III.10.I.1.a.iii Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the LAW Vitrification System will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., e., and h.

III.10.I.1.a.iv The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer; registered professional engineer; independent corrosion expert; independent, qualified installation inspector; installation inspector; etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new LAW Vitrification system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following LAW Vitrification System components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs [i.e., (a) through (g)], in accordance with WAC 173-303-680.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

III.10.I.1.a.v The Permittees will ensure periodic integrity assessments are conducted on the LAW Vitrification System listed in Permit Table III.10.I.A, as approved/modified pursuant to Permit Condition III.10.H.5, over the term of this Permit in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post closure, or corrective action is complete and certified, whichever is later.

III.10.I.1.a.vi The Permittees will address problems detected during the LAW Vitrification System integrity assessments specified in Permit Condition III.10.I.1.a.v. following the description of the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c.

III.10.I.1.a.vii All process monitors/instruments as specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., will be equipped with operational alarms to warn of deviation, or imminent deviation from the limits specified in Permit Table III.10.I.F.

III.10.I.1.a.viii The Permittees will install and test all process and leak detection system monitors/instruments, as specified in Permit Tables III.10.I.C and III.10.I.F, as approved/modified pursuant to Permit Condition III.10.H.5 and III.10.H.3.d.v., in accordance with Operating Unit Group 10, Appendices 9.1, 9.2, and 9.14 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.d.x. and III.10.H.5.f..xvi.

III.10.I.1.a.ix No dangerous and/or mixed waste will be treated in the LAW Vitrification System unless the operating conditions, specified under Permit Condition III.10.I.1.c. are complied with.

III.10.I.1.a.x The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the LAW Vitrification System if these substances could cause the sub-system, sub-system equipment, or the containment system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)]. This condition is not applicable to corrosion of LAW Vitrification System sub-system or sub-system equipment that are expected to be replaced as part of normal operations (e.g., melters).

III.10.I.1.a.xi The Permittees will operate the LAW Vitrification System to prevent spills and overflows using description of controls and practices as required under WAC 173-303-640(5)(b), described in Permit Condition III.10.C.5 and Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(c)(ix)].

III.10.I.1.a.xii For routinely non-accessible LAW Vitrification System sub-systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.H.5.e.vi., the Permittees will mark all routinely non-accessible LAW Vitrification System sub-systems access points with labels or signs to identify the waste contained in each LAW Vitrification System sub-system. The label, or sign, must be legible at a distance of at least fifty (50) feet and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the LAW Vitrification System sub-systems. For the purposes of this permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.I.1.a.xiii For the LAW Vitrification System sub-systems not addressed in Permit Condition III.10.I.1.a.xii., the Permittees will mark these LAW Vitrification System sub-systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the LAW Vitrification System sub-systems. The labels, or signs, must be legible at a distance of at least fifty (50) feet and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the LAW Vitrification System sub-systems [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.I.1.a.xiv The Permittees will ensure that the secondary containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.I.A and III.10.I.B, as approved/modified pursuant to Permit Condition III.10.H.5, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use of the LAW Vitrification System sub-systems. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303-640(4)(e)(i)(C), and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.I.1.a.xv The Permittees must immediately, and safely, remove from service any LAW Vitrification System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Condition III.10.I.1.a.xvii. A through D, and F. The affected LAW Vitrification System or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.I.1.a.xvii.E [WAC 173-303-640(7)(e) and (f) and WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.I.1.a.xvi An impermeable coating, as specified in Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.9, 9.11, and 9.12 of this Permit, as approved pursuant to Permit Condition III.10.H.5.b.v., will be maintained for all concrete containment systems and concrete portions of containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.I.A and III.10.I.B, as approved/modified pursuant to Permit Condition III.10.H.5 (concrete containment systems that do not have a liner, pursuant to WAC 173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2). The coating will prevent migration of any dangerous and/or mixed waste into the concrete. All coatings will meet the following performance standards:

A. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present.

B. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and mixed waste could migrate from the system.

C. The coating must be compatible with the dangerous and/or mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3) and WAC 173-303-806(4)(i)(i)(A)].

III.10.I.1.a.xvii The Permittees inspect all secondary containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.I.A and III.10.I.B, as approved/modified pursuant to Permit Condition III.10.H.5, in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c) and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)].

A. Immediately, and safely, stop the flow of dangerous and/or mixed waste into the LAW Vitrification System sub-systems or secondary containment system.

B. Determine the source of the dangerous and/or mixed waste.

C. Remove the waste from the containment area in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(7)(b). The waste removed from containment areas of the LAW Vitrification System sub-systems will be, as a minimum, managed as dangerous and/or mixed waste.

D. If the cause of the release was a spill that has not damaged the integrity of the LAW Vitrification System sub-system, the Permittees may return the LAW Vitrification System sub-system to service in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(7)(e)(ii). In such case, the Permittees will take action to ensure the incident that caused the dangerous and/or mixed waste to enter the containment system will not reoccur.

E. If the source of the dangerous and/or mixed waste is determined to be a leak from the primary LAW Vitrification System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees will comply with the requirements of WAC 173-303-640(7) and take the following actions:

1. Close the LAW Vitrification System sub-system following procedures in WAC 173-303-640(7)(e)(i), in accordance with WAC 173-303-680 and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

2. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.I.1.a.iii.) the LAW Vitrification

System in accordance with Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e.v., before the LAW Vitrification System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

F. The Permittees will document in the WTP Unit operating record actions/procedures taken to comply with A through E above, as specified in WAC 173-303-640(6)(d), in accordance with WAC 173-303-680(2) and (3).

G. In accordance with WAC 173-303-680(2) and (3), the Permittees will notify and report releases to the environment to Ecology, as specified in WAC 173-303-640(7)(d).

III.10.I.1.a.xviii If liquids (e.g., dangerous and/or mixed waste, leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C, listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal.

B. Measures implemented to ensure continued protection of human health and the environment.

C. Current actions being taken to remove liquids from secondary containment.

III.10.I.1.a.xix All air pollution control devices and capture systems in the LAW Vitrification System will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the air pollution control devices and capture systems in the LAW Vitrification System are properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.I.1.a.xx In all future narrative permit submittals, the Permittees will include LAW Vitrification sub-system names with the sub-system designation.

III.10.I.1.a.xxi For any portion of the LAW Vitrification System that has the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.I.1.a.xxii For each LAW Vitrification System sub-system holding dangerous and/or mixed waste that are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes, or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e), in accordance with WAC 173-303-680].

III.10.I.1.a.xxiii The existing LAW building will retain capability to install the third melter before or after hot start-up. No permanent systems, structures, or components shall be installed in the melter cell, pour cave or wet process cell for the third melter that would preclude future installation of the third melter.

III.10.I.1.b Performance Standards

III.10.I.1.b.i The LAW Vitrification System must achieve a destruction and removal efficiency (DRE) of 99.99% for the principal organic dangerous constituents (PODCs) listed below [40 CFR §63.1203(c)(1) and 40CFR §63.1203(c)(2), in accordance with WAC 173-303-680(2)]:

RESERVED

DRE in this permit condition will be calculated in accordance with the formula given below:

DRE=[1-(Wout/Win)] x 100%

Where:

Win=mass feed rate of one principal organic dangerous constituent (PODC) in a waste feed stream; and

Wout=mass emission rate of the same PODC present in exhaust emissions prior to release to the atmosphere.

III.10.I.1.b.ii Particulate matter emissions from the LAW Vitrification System will not exceed 34 mg/dscm (0.015 grains/dscf) [40 CFR §63.1203(b)(7), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.iii Hydrochloric acid and chlorine gas emissions from the LAW Vitrification System will not exceed 21 ppmv, combined [40 CFR §63.1203(b)(6), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.iv Dioxin and Furan TEQ emissions from the LAW Vitrification System will not exceed 0.2 nanograms (ng)/dscm, [40 CFR §63.1203(b)(1), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.v Mercury emissions from the LAW Vitrification System will not exceed 45 µg/dscm [40 CFR §63.1203(b)(2), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.vi Lead and cadmium emissions from the LAW Vitrification System will not exceed 120 µg/dscm, combined [40 CFR §63.1203(b)(3), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.vii Arsenic, beryllium, and chromium emissions from the LAW Vitrification System will not exceed 97 µg/dscm, combined [40 CFR §63.1203(b)(4), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.viii Carbon monoxide (CO) emission from the LAW Vitrification System will not exceed 100 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system), dry basis [40 CFR §63.1203(b)(5)(i), in accordance with WAC 173-303-680(2) and (3)];

III.10.I.1.b.ix Hydrocarbon emission from the LAW Vitrification System will not exceed 10 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system during demonstration testing required by this Permit), dry basis and reported as propane [40 CFR §63.1203(b)(5)(ii), in accordance with WAC 173-303-680(2) and (3)];

III.10.I.1.b.x If the emissions from the LAW Vitrification System exceed the emission rates listed in Permit Table III.10.I.E, as approved pursuant to Permit Condition III.10.C.11.c. or d., the Permittees will perform the following actions [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)]:

A. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.

B. Submit to Ecology additional risk information to indicate that the increased emissions impact is offset by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of exceeding the emission rate(s).

C. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. through g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

The emission limits specified in Permit Conditions III.10.I.1.b.i. through III.10.I.1.b.ix. above, will be met for the LAW Vitrification System by limiting feed rates as specified in Permit Tables III.10.I.D and III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5. and III.10.H.3.d.v., compliance with operating conditions specified in Permit Condition III.10.I.1.c. (except as specified in Permit Condition III.10.I.1.b.xii.), and compliance with Permit Condition III.10.I.1.b.xi.;

III.10.I.1.b.xi Treatment effectiveness, feed-rates and operating rates for dangerous and/or mixed waste management units contained in the LAW Building, but not included in Permit Table III.10.I.A, as approved/modified pursuant to Permit Condition III.10.H.5, will be as specified in Permit Sections III.10.D through F and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Condition III.10.C.11.c or III.10.C.11.d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)];

III.10.I.1.b.xii Except during periods of LAW Vitrification System startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.I.1.c., will be regarded as compliance with the required performance standards identified in Permit Conditions III.10.I.1.b.i. through x. However, if it is determined that during the effective period of this Permit that compliance with the operating conditions in Permit Condition III.10.I.1.c. is not sufficient to ensure compliance with the performance standards specified in Permit Conditions III.10.I.1.b.i. through x., the Permit may be modified, revoked, or reissued pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g.

III.10.I.1.c Operating Conditions [WAC 173-303-670(6), in accordance with WAC 173-303-680(2) and (3)]

The Permittees will operate the LAW Vitrification System in accordance with Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.H.5.e.vi. and Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e., and Operating Unit Group 10, Appendix 9.15

of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., except as modified pursuant to Permit Conditions III.10.H.3, III.10.I.1.b.x., III.10.I.1.b.xii., III.10.I.1.h., and in accordance with and the following:

III.10.I.1.c.i The Permittees will operate the LAW Vitrification System in order to maintain the systems and process parameters listed in Permit Tables III.10.I.C and III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., within the set-points specified in Permit Table III.10.I.F.

III.10.I.1.c.ii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., to automatically cut-off and/or lock-out the dangerous and/or mixed waste feed to LAW Vitrification System when the monitored operating conditions deviate from the set-points specified in Permit Table III.10.I.F.

III.10.I.1.c.iii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., to automatically cut-off and/or lock-out the dangerous and/or mixed waste feed to LAW Vitrification System when all instruments specified in Permit Table III.10.H.F for measuring the monitored parameters fails or exceeds its span value.

III.10.I.1.c.iv The Permittees will operate the AWFCO systems, specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., to automatically cut-off and/or lock out the dangerous waste and/or mixed waste feed to the LAW Vitrification System when any portion of the LAW Vitrification System is bypassed. The terms "bypassed" and "bypass event," as used in Permit Sections III.10.H and III.10.I, will mean if any portion of the LAW Vitrification System is bypassed so that gases are not treated as during the Demonstration Test.

III.10.I.1.c.v In the event of a malfunction of the AWFCO systems listed in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., the Permittees will immediately, manually cut-off the dangerous and/or mixed waste feed to the LAW Vitrification System. The Permittees will not restart the dangerous and/or mixed waste feed until the problem causing the malfunction has been identified and corrected.

III.10.I.1.c.vi The Permittees will manually cut-off the dangerous and/or mixed waste feed to the LAW Vitrification System when the operating conditions deviate from the limits specified in Permit Condition III.10.I.1.c.i., unless the deviation automatically activates the waste feed cut-off sequence specified in Permit Conditions III.10.I.1.c.ii., iii., and/or iv.

III.10.I.1.c.vii If greater than thirty (30) dangerous and/or mixed waste feed cut-off, combined, to the LAW Vitrification System occur due to deviations from Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., within a sixty (60) day period, the Permittees will submit a written report to Ecology within five (5) calendar days of the thirty-first exceedance, including the information specified below. These dangerous and/or mixed waste feed cut-offs to the LAW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous and/or mixed waste and waste residues continue to be processed in the LAW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified in Permit Table III.10.I.F, from which the set-point is deviated:

A. The parameter(s) that deviated from the set-point(s) in Permit Table III.10.I.F.

B. The magnitude, dates, and duration of the deviations.

C. Results of the investigation of the cause of the deviations.

D. Corrective measures taken to minimize future occurrences of the deviations.

III.10.I.1.c.viii If greater than thirty (30) dangerous and/or mixed waste feed cut-off, combined, to the LAW Vitrification System occur due to deviations from Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., within a thirty (30) day period, the Permittees will submit the written report required to be submitted pursuant to Permit Condition III.10.I.1.c.vii. to Ecology on the first business day following the thirty-first exceedance. These dangerous and/or mixed waste feed cut-offs to the LAW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous and/or mixed waste and waste residues continue to be processed in the LAW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.I.F, from which the set-point is deviated:

In accordance with WAC 173-303-680(2) and (3), the Permittees may not resume dangerous and/or mixed waste feed to the LAW Vitrification System until this written report has been submitted, and

A. Ecology has authorized the Permittees, in writing, to resume dangerous and/or mixed waste feed, or

B. Ecology has not, within seven (7) days, notified the Permittees in writing of the following:

   1. The Permittees written report does not document that the corrective measures taken will minimize future exceedances.

   2. The Permittees must take further corrective measures and document that these further corrective measures will minimize future exceedances.

III.10.I.1.c.ix If any portion of the LAW Vitrification System is bypassed while treating dangerous and/or mixed waste, it will be regarded as non-compliance with the operating conditions specified in Permit Condition III.10.I.1.c. and the performance standards specified in Permit Condition III.10.I.1.b. After such a bypass event, the Permittees will perform the following actions:

A. Investigate the cause of the bypass event.

B. Take appropriate corrective measures to minimize future bypasses.

C. Record the investigation findings and corrective measures in the WTP Unit operating record.

D. Submit a written report to Ecology within five (5) days of the bypass event documenting the result of the investigation and corrective measures.

III.10.I.1.c.x The Permittees will control fugitive emissions from the LAW Vitrification System by maintaining the melters under negative pressure.

III.10.I.1.c.xi Except during periods of vitrification system startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.I.1.c. will be regarded as compliance with the required performance standards identified in Permit Condition

III.10.I.1.b. However, evidence that compliance with these operating conditions is insufficient to ensure compliance with the performance standards, will justify modification, revocation, or re-issuance of this Permit, in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g.

III.10.I.1.d Inspection Requirements [WAC 173-303-680(3)]

III.10.I.1.d.i The Permittees will inspect the LAW Vitrification System in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.I.1.d.ii The inspection data for LAW Vitrification System will be recorded, and the records will be placed in the WTP Unit operating record for LAW Vitrification System, in accordance with Permit Condition III.10.C.4.

III.10.I.1.d.iii The Permittees will comply with the inspection requirements specified in Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f. and as modified by Permit Conditions III.10.H.3, III.10.I.1.b.x., III.10.I.1.b.xii., and III.10.I.1.h.

III.10.I.1.e Monitoring Requirements [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(3)]

III.10.I.1.e.i Upon receipt of a written request from Ecology, the Permittees will perform sampling and analysis of the dangerous and/or mixed waste and exhaust emissions to verify that the operating requirements established in the Permit achieve the performance standards delineated in this Permit.

III.10.I.1.e.ii The Permittees will comply with the monitoring requirements specified in the Operating Unit Group 10, Appendices 9.2, 9.3, 9.7, 9.13, 9.15 and 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5, and as modified by Permit Conditions III.10.H.3, III.10.I.1.h., III.10.I.1.b.x., and III.10.I.1.b.xii.

III.10.I.1.e.iii The Permittees will operate, calibrate, and maintain the carbon monoxide and hydrocarbon continuous emission monitors (CEM) specified in this Permit in accordance with Performance Specifications 4B and 8A of 40 CFR Part 60, Appendix B, in accordance with Appendix to Subpart EEE of 40 CFR Part 63, and Operating Unit Group 10 Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10. H.3, III.10.I.1.h., III.10.I.1.b.x., and III.10.I.1.b.xii.

III.10.I.1.e.iv The Permittees will operate, calibrate, and maintain the instruments specified in Permit Tables III.10.I.C and F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., in accordance with Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10.H.3, III.10.I.1.h., III.10.I.1.b.x., and III.10.I.1.b.xii.

III.10.I.1.e.v The Permittees shall calibrate, inspect, and maintain or replace the following Melter 1 and Melter 2 cooling water flow and temperature instruments in accordance with manufacturer's recommendations, or as specified in this permit, or otherwise agreed to by Ecology (Melter 1: FT/TI&FI-1206, FT/TI&FI-1209, FT/TI&FI-1215, FT/TI&FI-1218, FT/TI&FI-1221, FT/TI&FI-1224, FT/TI&FI-1227, FT/TI&FI-1233, FT/TI&FI-1236, FT/TI&FI-1536, FT/TI&FI-1539; Melter 2: FT/TI&FI-2206, FT/TI&FI-2209, FT/TI&FI-2215, FT/TI&FI-2218, FT/TI&FI-2221, FT/TI&FI-2224,

FT/TI&FI-2227, FT/TI&FI-2233, FT/TI&FI-2236, FT/TI&FI-2536, FT/TI&FI-2539).

III.10.I.1.f Recordkeeping Requirements [WAC 173-303-380 and WAC 173-303-680(3)]

III.10.I.1.f.i The Permittees will record and maintain in the WTP Unit operating record for the LAW Vitrification System, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4 and 5, as modified by Permit Conditions III.10.H.3, III.10.I.1.h., III.10.I.1.b.x., and III.10.I.1.b.xii.

III.10.I.1.f.ii The Permittees will record in the WTP Unit operating record the date, time, and duration of all automatic waste feed cutoffs and/or lockouts, including the triggering parameters, reason for the deviation, and recurrence of the incident.
The Permittees will also record all incidents of AWFCO system function failures, including the corrective measures taken to correct the condition that caused the failure.

III.10.I.1.f.iii The Permittees will submit to Ecology an annual report each calendar year within ninety (90) days following the end of the year. The report will include the following information:

A. Total dangerous and/or mixed waste feed processing time for the LAW Vitrification System.
B. Date/Time of all LAW Vitrification System startups and shutdowns.
C. Date/Time/Duration/Cause/Corrective Action taken for all LAW Vitrification System shutdowns caused by malfunction of either process or control equipment.
D. Date/Time/Duration/Cause/Corrective Action taken for all instances of dangerous and/or mixed waste feed cut-off due to deviations from Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v.

III.10.I.1.f.iv The Permittees will submit an annual report to Ecology each calendar year within ninety (90) days following the end of the year of all quarterly CEM Calibration Error and Annual CEM Performance Specification Tests conducted, in accordance with Permit Condition III.10.I.1.e.iii.

III.10.I.1.f.v The Permittees shall maintain operating and calibration/maintenance records for Ecology's inspection for the following Melter 1 and Melter 2 cooling water flow and temperature instruments (Melter 1: FT/TI&FI-1206, FT/TI&FI-1209, FT/TI&FI-1215, FT/TI&FI-1218, FT/TI&FI-1221, FT/TI&FI-1224, FT/TI&FI-1227, FT/TI&FI-1233, FT/TI&FI-1236, FT/TI&FI-1536, FT/TI&FI-1539; Melter 2: FT/TI&FI-2206, FT/TI&FI-2209, FT/TI&FI-2215, FT/TI&FI-2218, FT/TI&FI-2221, FT/TI&FI-2224, FT/TI&FI-2227, FT/TI&FI-2233, FT/TI&FI-2236, FT/TI&FI-2536, FT/TI&FI-2539).

III.10.I.1.f.vi The Permittees shall maintain refractory thermocouple temperature data for Ecology inspection.

III.10.I.1.g Closure

The Permittees will close the LAW Vitrification System in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.I.1.h Periodic Emission Re-testing Requirements [WAC 173-303-670(5), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)]

III.10.I.1.h.i Dioxin and Furan Emission Testing

A. Within eighteen (18) months of commencing operation pursuant to Permit Section III.10.I, the Permittees will submit to Ecology for approval, a Dioxin and Furan Emission Test Plan (DFETP) for the performance of emission testing of the LAW Vitrification System gases for dioxin and furans during "Normal Operating Conditions" as a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f. The DFETP will include all elements applicable to dioxin and furan emission testing included in the "Previously Approved Demonstration Test Plan," applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for dioxin and furan emission test. "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified in Permit Table III.10.I.F (as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v.), that were established to maintain compliance with Permit Condition III.10.I.1.b.iv. as specified in Operating Unit Group 10, Appendix 9.15 of this Permit (as approved pursuant to Permit Condition III.10.H.3.d., and in accordance with III.10.I.1.b.xii. and III.10.I.1.c.xi.), are held within the range of the average value over the previous twelve (12) months and the set-point value specified in Permit Table III.10.I.F. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste.

2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.I.D (as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v.). Feed-rate of organics as measured by TOC are held within the range of the average value over the previous twelve (12) months. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.H.5.f.

B. Within sixty (60) days of Ecology's approval of the DFETP, or within thirty-one (31) months of commencing operation pursuant to Permit Section III.10.I, whichever is later, the Permittees will implement the DFETP approved pursuant to Permit Condition III.10.I.1.h.i.A.

C. The Permittees will resubmit the DFETP, approved pursuant to Permit Condition III.10.I.1.h.i.A, revised to include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for dioxin and furan emission test as a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f. at twenty-four (24) months from the implementation date of the testing required pursuant to Permit Condition III.10.I.1.h.i.A and at reoccurring eighteen (18) month intervals from the implementation date of the previously approved DFETP. The Permittees will implement these newly approved revised DFETPs, every thirty-one (31) months from the previous approved DFETP implementation date or within sixty (60) days of the newly Ecology approved revised DFETP, whichever is later, for the duration of this Permit.

D. The Permittees will submit a summary of operating data collected pursuant to the DFETPs in accordance with Permit Conditions III.10.I.1.h.i.A and C to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified as specified in WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

E. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.I.1.h.i.A and C. show that one or more of the performance standards listed in Permit Condition III.10.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the LAW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).

2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified in Permit Condition I.E.21.

3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).

4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were met during the demonstration test, if any such mode was demonstrated.

5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.I.1.h.i.E.1 through 4 above, and any additional information, Ecology may provide in writing, direction to the Permittees to stop dangerous waste and mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan pursuant to Permit Condition III.10. I.1.h.i.E.6.

6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e.and III.10.C.2.f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and F.

F. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.I.1.h.i.A and C show that any emission rate for any constituent listed in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.C.11.c. or d. is exceeded for LAW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s), as specified in Permit Condition I.E.21.
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance and submit a report of the investigation findings to Ecology within fifteen (15) days of this discovery of exceeding the emission rate(s).
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and III.10.I.F.

III.10.I.1.h.ii Non-organic Emission Testing

A. Within forty-eight (48) months of commencing operation pursuant to Permit Section III.10.I, the Permittees will resubmit to Ecology for approval the "Previously Approved Demonstration Test Plan" revised as a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2f. The revised Demonstration Test Plan (RDTP) will include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, projected commencement and completion dates for emission testing to demonstrate performance standards specified in Permit Conditions III.10.I.1.b.ii., iii., v., vi., and vii., and non-organic emissions as specified in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d., under "Normal Operating Conditions." "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d., that were established to maintain compliance with Permit Conditions III.10.I.1.b.ii., iii., v., vi., and vii., and non-organic emissions, as specified in Permit Table III.10.I.E, as specified in Operating Unit Group 10, Appendix 9.15 of this Permit (as approved pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d.), are held within the range of the average value over the previous twelve (12) months and the set-point value specified in Permit Table III.10.I.F. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous or mixed waste.

2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified in Permit Table III.10.I.D, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d. The average value is defined as the sum of all rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous or mixed waste.

For purposes of this permit condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.H.5.f.

B. Within sixty (60) days of Ecology's approval of the RDTP, or within sixty (60) months of commencing operation pursuant to Permit Section III.10.I, whichever is later, the Permittees will implement the RDTP approved pursuant to Permit Condition III.10.I.1.h.ii.A.

C. The Permittees will resubmit the RDTP, approved pursuant to Permit Condition III.10.I.1.h.ii.A, revised to include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for emission test as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. at forty-eight (48) months from the implementation date of the testing required pursuant to Permit Condition III.10.I.1.h.ii.A and at reoccurring forty-eight (48) month intervals from the implementation date of the previously approved RDTP. The Permittees will implement these newly approved revised RDTP, every sixty (60) months from the previous approved RDTP implementation date or within sixty (60) days of the newly Ecology approved revised RDTP, whichever is later, for the duration of this Permit.

D. The Permittees will submit a summary of operating data collected pursuant to the RDTPs in accordance with Permit Conditions III.10.I.1.h.ii.A and C to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified pursuant to WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

E. If any calculations or testing results collected pursuant to the RDTPs in accordance with Permit Conditions III.10.I.1.h.ii.A and C show that any emission rate for any constituent listed in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d., is exceeded for LAW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s), as specified in Permit condition I.E.21;

2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance and submit a report of the investigation findings to Ecology within fifteen (15) days of this discovery of exceeding the emission rate(s); and

3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed

to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and III.10.I.F.

F. If any calculations or testing results collected pursuant to the RDTPs in accordance with Permit Conditions III.10.I.1.h.ii.A and C show that one or more of the performance standards listed in Permit Condition III.10.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the LAW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s);
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified in Permit condition I.E.21;
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s);
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were met during the demonstration test, if any such mode was demonstrated;
5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.I.1.h.ii.F.1 through 4 above, and any additional information, Ecology may provide in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan pursuant to Permit Condition III.10.I.1.h.ii.F.6; and
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and F.

III.10.I.1.h.iii Other Emission Testing

A. Within seventy-eight (78) months of commencing operation pursuant to Permit Section III.10.I, the Permittees will resubmit to Ecology for approval the "Previously Approved Demonstration Test Plan" revised as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. The Revised Demonstration Test Plan (RDTP) will include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, projected commencement and completion dates for emission testing to demonstrate performance standards as specified in Permit Conditions III.10.I.1.b.viii. and ix., and emissions as specified in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and

III.10.C.11.c. or d., not addressed under Permit Conditions III.10.I.1.h.i. or ii. under "Normal Operating Conditions." "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Condition III.10.H.3.d. and III.10.C.11.c. or d., that were established to maintain compliance with Permit Conditions III.10.I.1.b.viii. and ix., and emissions as specified in Permit Table III.10.I.E, not addressed under Permit Conditions III.10.I.1.h.i. or ii. as specified in Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.3.d., and in accordance with Permit Conditions III.10.I.1.b.xii. and III.10.I.1.c.xi. are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.I.F. The average value is defined as the sum of all rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste.
2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified in Permit Table III.10.I.D, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d. Feed-rate of organics as measured by TOC are held within the range of the average value over the previous twelve (12) months. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.H.5.f.

B. Within sixty (60) days of Ecology's approval of the RDTP, or within ninety-one (91) months of commencing operation pursuant to Permit Section III.10.I, whichever is later, the Permittees will implement the RDTP approved pursuant to Permit Condition III.10.I.1.h.iii.A.

C. The Permittees will submit a summary of operating data collected pursuant to the RDTPs in accordance with Permit Condition III.10.I.1.h.iii.A to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified as specified in WAC 173-303-807(8), in accordance with Permit Condition WAC 173-303-680(2) and (3).

D. If any calculations or testing results show that one or more of the performance standards listed in Permit Condition III.10.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the LAW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s);

2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified in Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were met during the demonstration test, if any such mode was demonstrated.
5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.I.1.h.iii.D.1 through 4 above, and any additional information, Ecology may provide in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan, pursuant to Permit Condition III.10. I.h.1.iii.D.6.
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and III.10.I.F.

E. If any calculations or testing results show that any emission rate for any constituent listed in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.C.11.c. or d., is exceeded for LAW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s), as specified in Permit Condition I.E.21.
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of the exceedance of the emission rate(s).
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and F.

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Table III.10.I.A - LAW Vitrification System Description[a]

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables and Figures
RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.I.A will be completed in accordance with Permit Condition III.10.H.5.e x., prior to initiating Permit Condition III.10.I.1. See Permit Table III.10.H.A for the current LAW Vitrification System Description.

Table III.10.I.B - LAW Vitrification System Secondary Containment Systems Including Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos, Specification Nos, etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.I.B will be completed in accordance with Permit Condition III.10.H.5.b.vii., prior to initiating Permit Condition III.10.I.1. See Permit Table III.10.H.B for the current LAW Vitrification System Secondary Containment Systems Including Sumps and Floor Drains.

[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.I.C - LAW Vitrification Systems Process and Leak Detection System Instruments and Parameters

Sub-system Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Failure State	Expected Range	Instrument Accuracy	Instrument Calibration Method No. and Range
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.I.C will be completed in accordance with Permit Condition III.10.H.5.e.ix., prior to initiating Permit Condition III.10.I.1 See Permit Table III.10.H.C for the current LAW Vitrification Systems Process and Leak Detection System Instruments and Parameters.

Table III.10.I.D - Maximum Feed-rates to LAW Vitrification System (RESERVED)

Description of Waste	Normal Operation
Dangerous and/or Mixed Waste Feed Rate	RESERVED
Ash Feed Rate	RESERVED
Total Chlorine/Chloride Feed Rate	RESERVED
Total Metal Feedrates	RESERVED

Table III.10.I.E - LAW Vitrification System Estimated Emission Rates (RESERVED)

Chemicals	CAS Number	Emission Rates (grams /second)
RESERVED	RESERVED	RESERVED

TABLE III.10.I.F - LAW Vitrification System Waste Feed Cut-off Parameters* [1](RESERVED)

Sub-system Designation	Instrument Tag Number	Parameter Description	Set-points During Normal Operation
RESERVED	RESERVED	RESERVED	RESERVED

TABLE III.10.I.F - LAW Vitrification System Waste Feed Cut-off Parameters*
[1](RESERVED)

Sub-system Designation	Instrument Tag Number	Parameter Description	Set-points During Normal Operation
*A continuous monitoring system will be used as defined in Permit Section III.10.C.1. [1]Maximum Feed-rate will be set based on not exceeding any of the constituent (e.g., metals, ash, and chlorine/chloride) feed limits specified on Table III.10.I.D. of this Permit			

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III.10.J HLW VITRIFICATION SYSTEM – SHORT TERM MISCELLANEOUS THERMAL TREATMENT UNIT-SHAKEDOWN, DEMONSTRATION TEST, AND POST DEMONSTRATION TEST

For purposes of Permit Section III.10.J, where reference is made to WAC 173-303-640, the following substitutions apply: substituting the terms "HLW Vitrification System" for "tank system(s)," "sub-system(s)" for "tank(s)," "sub-system equipment" for "ancillary equipment," and "sub-system(s) or sub-system equipment of a HLW Vitrification System" for "component(s)," in accordance with WAC 173-303-680.

III.10.J.1 General Conditions During Shakedown, Demonstration Test, and Post-Demonstration Test for HLW Vitrification System

III.10.J.1.a Construction and Maintenance [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-340].

III.10.J.1.a.i The Permittees will construct the HLW Vitrification System (listed in Permit Tables III.10.J.A and III.10.J.B, as approved/modified pursuant to Permit Condition III.10.J.5.) as specified in Permit Condition III.10.J.1. and Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 10.1 through 10.15 and 10.17 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.a. through d., and III.10.J.5.f.

III.10.J.1.a.ii The Permittees will construct all containment systems for the HLW Vitrification System as specified in Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 10.2, 10.4, through 10.14 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.a. through d.

III.10.J.1.a.iii The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer, independent corrosion expert, independent qualified installation inspector, etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10.:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new HLW Vitrification system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following HLW Vitrification system components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)) in accordance with WAC 173-303-680).

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

III.10.J.1.a.iv The Permittees must ensure that proper handling procedures are adhered to in order to prevent damage to the HLW Vitrification System during installation. Prior to covering, enclosing, or placing the new HLW Vitrification System or component in use, an independent, qualified, installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of similar systems or components, must inspect the system for the presence of any of the following items:

A. Weld breaks

B. Punctures

C. Scrapes of protective coatings

D. Cracks

E. Corrosion

F. Other structural damage or inadequate construction/installation

All discrepancies must be remedied before the HLW Vitrification system is covered, enclosed, or placed in use [WAC 173-303-640(3)(c), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.v For the HLW Vitrification System or components that are placed underground and that are back-filled, the Permittees must provide a backfill material that is a non-corrosive, porous, homogeneous substance. The backfill must be installed so that it is placed completely around the HLW Vitrification System and compacted to ensure that the HLW Vitrification System is fully and uniformly supported [WAC 173-303-640(3)(d), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.vi The Permittees must test for tightness the HLW Vitrification System or components, prior to being covered, enclosed, or placed into use. If the HLW Vitrification System or components are found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the HLW Vitrification System being covered, enclosed, or placed in use [WAC 173-303-640(3)(e), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.vii The Permittees must ensure the HLW Vitrification System equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction [WAC 173-303-640(3)(f), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.viii The Permittees must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided in Operating Unit Group 10, Appendices 10.9 and 10.11 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.b.i., III.10.J.5.b.iv., III.10.J.5.b.v., III.10.J.5.c.i., III.10.J.5.c.iv., III.10.J.5.c.v., III.10.J.5.d.i., III.10.J.5.d.iv., and III.10.J.5.d.v., or other corrosion protection if Ecology believes other corrosion protection is necessary to ensure the integrity of the HLW Vitrification System during use of the HLW Vitrification System. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation [WAC 173-303-640(3)(g), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.ix Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will obtain and keep on file in the WTP Unit operating record, written statements by those persons required to certify the design of the HLW Vitrification System and supervise the installation of the HLW Vitrification System, as specified in WAC 173-303-640(3)(b), (c), (d), (e), (f), and (g), in accordance with WAC 173-303-680, attesting that the HLW Vitrification system and corresponding containment system listed in Permit Tables III.10.J.A and III.10.J.B, as approved/modified pursuant to Permit Condition III.10.J.5., were properly designed and installed, and that repairs, in accordance with WAC 173-303-640(3)(c) and (e), were performed [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(h), in accordance with WAC 173-303-680(3)].

III.10.J.1.a.x The independent HLW Vitrification System installation inspection and subsequent written statements will be certified in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.J.1.a.iii., comply with all requirements of WAC 173-303-640(3)(h) in accordance with WAC 173-303-680, and will consider, but not be limited to, the following LAW Vitrification System installation documentation:

A. Field installation report with date of installation.

B. Approved welding procedures.

C. Welder qualification and certifications.

D. Hydro-test reports, as applicable, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Division 1; American Petroleum Institute (API) Standard 620, or Standard 650, as applicable;

E. Tester credentials.

F. Field inspector credentials.

G. Field inspector reports.

H. Field waiver reports.

I. Non-compliance reports and corrective action (including field waiver reports) and repair reports.

III.10.J.1.a.xi The Permittees will ensure periodic integrity assessments are conducted on the HLW Vitrification System, listed in Permit Table III.10.J.A, as approved/modified pursuant to Permit Condition III.10.J.5., over the term of this Permit, in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.J.1.a.xii The Permittees will address problems detected during the HLW Vitrification System integrity assessments specified in Permit Condition III.10.J.1.a.xi. following the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c.

III.10.J.1.a.xiii All process monitors/instruments as specified in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., will be equipped with operational alarms to warn of deviation, or imminent deviation from the limits specified in Permit Table III.10.J.F.

III.10.J.1.a.xiv The Permittees will install and test all process and leak detection system monitors/instrumentation as specified in Permit Tables III.10.J.C and III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5, in accordance with Operating Unit Group 10, Appendices 10.1, 10.2, and 10.14 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.d.x. and III.10.J.5.f.xvi.

III.10.J.1.a.xv Except during periods of HLW Vitrification System start up and shut down, no dangerous and/or mixed waste will be treated in the HLW Vitrification System unless the operating conditions specified under Permit Condition III.10.J.1.c. are complied with.

III.10.J.1.a.xvi The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the HLW Vitrification System if these substances could cause the subsystem, subsystem equipment, or the containment system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)]. This condition is not applicable to corrosion of HLW Vitrification System sub-system and sub-system equipment that are expected to be replaced as part of normal operations (e.g., melters).

III.10.J.1.a.xvii The Permittees will operate the HLW Vitrification System to prevent spills and overflows using description of controls and practices as required under WAC 173-303-640(5)(b) described in Permit Condition III.10.C.5, and Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(c)(ix)].

III.10.J.1.a.xviii For routinely non-accessible HLW Vitrification System sub-systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.J.5.e.vi., the Permittees will mark all routinely non-accessible HLW Vitrification System sub-systems access points with labels or signs to identify the waste contained in each HLW Vitrification System sub-system. The label, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the HLW Vitrification System sub-systems. For the purposes of this permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.J.1.a.xix For all HLW Vitrification System sub-systems not addressed in Permit Condition III.10.J.1.a.xviii., the Permittees will mark all these HLW Vitrification System sub-systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the HLW Vitrification System sub-systems. The labels, or signs, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the HLW Vitrification System sub-systems [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.J.1.a.xx The Permittees will ensure that the containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10.J.A. and III.10.J.B, as approved/modified pursuant to Permit Condition III.10.J.5, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use of the HLW Vitrification System sub-systems. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303–640(4)(e)(i)(C), and WAC 173-303-640(6), in accordance with

WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.J.1.a.xxi The Permittees must immediately, and safely, remove from service any HLW Vitrification System or secondary containment system which, through an integrity assessment, is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Conditions III.10.J.1.a.xxiii.A. through D., and F. The affected HLW Vitrification System, or secondary containment system, must be either repaired or closed in accordance with Permit Condition III.10.J.1.a.xxiii.E. [WAC 173-303-640(7)(e) and (f), and WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.J.1.a.xxii An impermeable coating, as specified in Operating Unit Group 10, Appendices 10.4, 10.5, 10.7, 10.9, 10.11, and 10.12 of this Permit, as approved pursuant to Permit Condition III.10.J.5.b.v., will be maintained for all concrete containment systems and concrete portions of containment systems for each HLW Vitrification System sub-systems listed in Permit Tables III.10.J.A and III.10.J.B as approved/modified pursuant to Permit Condition III.10.J.5 (concrete containment systems that do not have a liner, pursuant to WAC 173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2). The coating will prevent migration of any dangerous and mixed waste into the concrete. All coatings will meet the following performance standards:

A. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate, are present;

B. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and mixed waste could migrate from the system; and

C. The coating must be compatible with the dangerous and mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(i)(i)(A)].

III.10.J.1.a.xxiii The Permittees will inspect all containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10.J.A and III.10.J.B, as approved/modified pursuant to Permit Condition III.10.J.5., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c) and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)]:

A. Immediately, and safely, stop the flow of dangerous and/or mixed waste into the HLW Vitrification System sub-systems or secondary containment system.

B. Determine the source of the dangerous and/or mixed waste.

C. Remove the dangerous and/or mixed waste from the containment area in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(b). The dangerous and/or mixed waste removed from containment areas of the HLW Vitrification System sub-systems will be, as a minimum, managed as mixed waste.

D. If the cause of the release was a spill has not damaged the integrity of the HLW Vitrification System sub-system, the Permittees may return the HLW Vitrification System sub-system to service in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(e)(ii). In such case, the Permittees will take action to ensure the incident that caused the dangerous and/or mixed waste to enter the containment system will not re-occur [WAC 173-303-320(3)].

E. If the source of the dangerous and/or mixed waste is determined to be a leak from the primary HLW Vitrification System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees will comply with the requirements of WAC 173-303-640(7) and take the following actions:

1. Close the HLW Vitrification System Sub-system following procedures in WAC 173-303-640(7)(e)(i), in accordance with WAC 173-303-680 and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8., or

2. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.J.1.a.iii.) the HLW Vitrification System in accordance with Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e.v., before the HLW Vitrification System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

F. The Permittees will document, in the WTP Unit operating record, actions/procedures taken to comply with A. through E. above, as specified in WAC 173-303-640(6)(d), in accordance with WAC 173-303-680(2) and (3).

G. In accordance with WAC 173-303-680(2) and WAC 173-303-680 (3), the Permittees will notify and report releases to the environment to Ecology, as specified in WAC 173-303-640(7)(d).

III.10.J.1.a.xxiv If liquids (e.g., dangerous and/or mixed waste leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C, listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal;

B. Measures implemented to ensure continued protection of human health and the environment;

C. Current actions being taken to remove liquids from secondary containment.

III.10.J.1.a.xxv All air pollution control devices and capture systems in the HLW Vitrification System will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the air pollution control devices and capture systems in the HLW

Vitrification System are properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.J.1.a.xxvi In all future narrative permit submittals, the Permittees will include HLW Vitrification sub-system names with the sub-system designation.

III.10.J.1.a.xxvii Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the HLW Vitrification System will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., e., and h.

III.10.J.1.a.xxviii For any portion of the HLW Vitrification System that has the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.J.1.a.xxix For each HLW Vitrification System sub-system holding dangerous waste which are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e) in accordance with WAC 173-303-680].

III.10.J.1.b Performance Standards

III.10.J.1.b.i The HLW Vitrification System must achieve a destruction and removal efficiency (DRE) of 99.99% for the principal organic dangerous constituents (PODCs) listed below [40 CFR §63.1203(c)(1) and 40-CFR 63.1203(c)(2), in accordance with WAC 173-303-680(2)].

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DRE in this Permit condition will be calculated in accordance with the formula given below:

DRE=[1-(Wout/Win)] x 100%

Where:

Win=mass feed rate of one principal organic dangerous constituent (PODC) in a waste feed stream; and

Wout=mass emission rate of the same PODC present in exhaust emissions prior to release to the atmosphere.

III.10.J.1.b.ii Particulate matter emissions from the HLW Vitrification System will not exceed 34 mg/dscm (0.015 grains/dscf) [40 CFR §63.1203(b)(7), in accordance with WAC 173-303-680(2)]:

III.10.J.1.b.iii Hydrochloric acid and chlorine gas emissions from the HLW Vitrification System will not exceed 21 ppmv, combined [40 CFR §63.1203(b)(6), in accordance with WAC 173-303-680(2)]:

III.10.J.1.b.iv Dioxin and Furan TEQ emissions from the HLW Vitrification System will not exceed 0.2 nanograms (ng)/dscm [40 CFR §63.1203(b)(1), in accordance with WAC 173-303-680(2)]:

III.10.J.1.b.v Mercury emissions from the HLW Vitrification System will not exceed 45 μg/dscm, [40 CFR §63.1203(b)(2), in accordance with WAC 173-303-680(2)].

III.10.J.1.b.vi Lead and cadmium emissions from the HLW Vitrification System will not exceed 120 µg/dscm, combined [40 CFR §63.1203(b)(3), in accordance with WAC 173-303-680(2)].

III.10.J.1.b.vii Arsenic, beryllium, and chromium emissions from the HLW Vitrification System will not exceed 97 µg/dscm, combined [40 CFR §63.1203(b)(4), in accordance with WAC 173-303-680(2)].

III.10.J.1.b.viii Carbon monoxide (CO) emission from the HLW Vitrification System will not exceed 100 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system), dry [40 CFR §63.1203(b)(5)(i), in accordance with WAC 173-303-680(2)].

III.10.J.1.b.ix Hydrocarbon emission from the HLW Vitrification System will not exceed 10 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system during demonstration testing required by this Permit), dry basis, and reported as propane [40 CFR §63.1203(b)(5)(ii), in accordance with WAC 173-303-680(2)]:

III.10.J.1.b.x If the emissions from the HLW Vitrification System exceed the emission rates listed in Permit Table III.10.J.E, as approved pursuant to Permit Condition III.10.C.11.b., the Permittees will notify Ecology, in accordance with Permit Condition III.10.J.3.d.vii. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

The emission limits specified in Permit Conditions III.10.J.1.b.i. through III.10.J.1.b.ix. above, will be met for the HLW Vitrification System by limiting feed rates as specified in Permit Tables III.10.J.D and III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., compliance with operating conditions specified in Permit Condition III.10.J.1.c. (except as specified in Permit Condition III.10.J.1.b.xii.), and compliance with Permit Condition III.10.J.1.b.xi.

III.10.J.1.b.xi Treatment effectiveness, feed-rates and operating rates for dangerous and mixed waste management units contained in the HLW Building, but not included in Permit Table III.10.J.A, as approved/modified pursuant to Permit Condition III.10.J.5., will be as specified in Permit Sections III.10.D, III.10.E, III.10.F and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Conditions III.10.C.11.c. or III.10.C.11.d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

III.10.J.1.b.xii Except during periods of HLW Vitrification System startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.J.1.c., will be regarded as compliance with the required performance standards identified in Permit Conditions III.10.J.1.b.i. through x. However, if it is determined that during the effective period of this Permit that compliance with the operating conditions in Permit Condition III.10.J.1.c. is not sufficient to ensure compliance with the performance standards specified in Permit Conditions III.10.J.1.b.i. through x., the Permit may be modified, revoked, or reissued pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g.

III.10.J.1.c Operating Conditions [WAC-303-670(6), in accordance with WAC 173-303-680(2) and (3)].

The Permittees will operate the HLW Vitrification System in accordance with Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.J.5.e.vi., and Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e., and Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., except as modified pursuant to Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., III.10.J.4., and in accordance with the following:

III.10.J.1.c.i The Permittees will operate the HLW Vitrification System in order to maintain the systems and process parameters listed in Permit Tables III.10.J.C and III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., within the set-points specified in Permit Table III.10.J.F.

III.10.J.1.c.ii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., to automatically cut-off and/or lock-out the dangerous and mixed waste feed to the HLW Vitrification System when the monitored operating conditions deviate from the set-points specified in Permit Table III.10.J.F.

III.10.J.1.c.iii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., to automatically cut-off and/or lock-out the dangerous and mixed waste feed to the HLW Vitrification System when all instruments specified on Permit Table III.10.H.F for measuring the monitored parameters fails or exceeds its span value

III.10.J.1.c.iv The Permittees will operate the AWFCO systems, specified in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., to automatically cut-off and/or lock out the dangerous and/or mixed waste feed to the HLW Vitrification System when any portion of the HLW Vitrification System is bypassed. The terms "bypassed" and "bypass event" as used in Permit Sections III.10.J and III.10.K will mean if any portion of the HLW Vitrification System is bypassed so that gases are not treated as during the Demonstration Test.

III.10.J.1.c.v In the event of a malfunction of the AWFCO systems listed in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., the Permittees will immediately, manually cut-off the dangerous and mixed waste feed to the HLW Vitrification System. The Permittees will not restart the dangerous and/or mixed waste feed until the problem causing the malfunction has been identified and corrected.

III.10.J.1.c.vi The Permittees will manually cut-off the dangerous and mixed waste feed to the HLW Vitrification System when the operating conditions deviate from the limits specified in Permit Condition III.10.J.1.c.i., unless the deviation automatically activates the waste feed cut-off sequence specified in Permit Conditions III.10.J.1.c.ii., III.10.J.1.c.iii., and/or III.10.J.1.c.iv.

III.10.J.1.c.vii If greater than thirty (30) dangerous and mixed waste feed cut-offs, combined, to the HLW Vitrification System occur due to deviations from Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., within a sixty (60) day period, the Permittees will submit a written report to Ecology within five (5) calendar days of the thirty-first exceedance including the information specified below. These dangerous and mixed waste feed cut-offs to the HLW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous waste, mixed waste, and waste residues continue to be processed in the HLW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.J.F, from which the set-point is deviated:

A. The parameter(s) that deviated from the set-point(s) in Permit Table III.10.J.F.

B. The magnitude, dates, and duration of the deviations.

C. Results of the investigation of the cause of the deviations.

D. Corrective measures taken to minimize future occurrences of the deviations.

III.10.J.1.c.viii If any portion of the HLW Vitrification System is bypassed while treating dangerous and/or mixed waste, it will be regarded as non-compliance with the operating conditions specified in Permit Condition III.10.J.1.c. and the performance standards specified in Permit Condition III.10.J.1.b. After such a bypass event, the Permittees will perform the following actions:

A. Investigate the cause of the bypass event.

B. Take appropriate corrective measures to minimize future bypasses.

C. Record the investigation findings and corrective measures in the operating record.

D. Submit a written report to Ecology within five (5) days of the bypass event documenting the result of the investigation and corrective measures.

III.10.J.1.c.ix The Permittees will control fugitive emissions from the HLW Vitrification System by maintaining the melter under negative pressure.

III.10.J.1.c.x Except during periods of HLW Vitrification System startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.J.1.c. will be regarded as compliance with the required performance standards identified in Permit Condition III.10.J.1.b. However, evidence that compliance with these operating conditions is insufficient to ensure compliance with the performance standards, will justify modification, revocation, or re-issuance of this Permit, in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g.

III.10.J.1.d Inspection Requirements [WAC 173-303-680(3)].

III.10.J.1.d.i The Permittees will inspect the HLW Vitrification System in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.J.1.d.ii The inspection data for HLW Vitrification System will be recorded, and the records will be placed in the WTP Unit operating record for the HLW Vitrification System, in accordance with Permit Condition III.10.C.4.

III.10.J.1.d.iii The Permittees will comply with the inspection requirements specified in Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.e Monitoring Requirements [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(3)]

III.10.J.1.e.i Upon receipt of a written request from Ecology, the Permittees will perform sampling and analysis of the dangerous and mixed waste and exhaust emissions to verify that the operating requirements established in the Permit achieve the performance standards delineated in this Permit.

III.10.J.1.e.ii The Permittees will comply with the monitoring requirements specified in Operating Unit Group 10, Appendices 10.2, 10.3, 10.7, 10.13, 10.15, and 10.18 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.c., III.10.J.5.d., III.10.J.5.e., and III.10.J.5.f., as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.e.iii The Permittees will operate, calibrate, and maintain the carbon monoxide and hydrocarbon continuous emission monitors (CEM) specified in this Permit in accordance with Performance Specification 4B and 8A of 40 CFR Part 60, Appendix B, in accordance with Appendix to Subpart EEE of 40 CFR Part 63, and Operating Unit Group 10 Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.e.iv The Permittees will operate, calibrate, and maintain the instruments specified on Permit Tables III.10.J.C and F, as approved/modified pursuant to Permit Condition III.10.J.5., in accordance with Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.f Recordkeeping Requirements [WAC 173-303-380 and WAC 173-303-680(3)]

III.10.J.1.f.i The Permittees will record and maintain in the WTP Unit operating record for the HLW Vitrification System, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4. and III.10.C.5., as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.f.ii The Permittees will record in the WTP Unit operating record the date, time, and duration of all automatic waste feed cut-offs and/or lockouts, including the triggering parameters, reason for the deviation, and recurrence of the incident. The Permittees will also record all incidents of AWFCO system function failures, including the corrective measures taken to correct the condition that caused the failure.

III.10.J.1.f.iii The Permittees will submit to Ecology a report semi-annually the first calendar year, and annually thereafter each calendar year within ninety (90) days following the end of the year. The report will include the following information:

A. Total dangerous and mixed waste feed processing time for the HLW Vitrification System.

B. Date/Time of all HLW Vitrification System startups and shutdown.

C. Date/Time/Duration/Cause/Corrective Action taken for all HLW Vitrification System shutdowns caused by malfunction of either process or control equipment.

D. Date/Time/Duration/Cause/Corrective Action taken for all instances of dangerous and/or mixed waste feed cut-off due to deviations from Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5.

III.10.J.1.f.iv The Permittees will submit an annual report to Ecology each calendar year within ninety (90) days following the end of the year of all quarterly CEM Calibration Error and Annual CEM Performance Specification Tests conducted in accordance with Permit Condition III.10.J.1.e.iii.

III.10.J.1.g Closure

The Permittees will close the HLW Vitrification System in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.J.2 **Shakedown Period [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].**

III.10.J.2.a The shakedown period for the HLW Vitrification System will be conducted in accordance with Permit Condition III.10.J.1., Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified in accordance with Permit Conditions III.10.J.1.b.xii., III.10.J.2., and III.10.J.3.

III.10.J.2.b Duration of the Shakedown Period

III.10.J.2.b.i The shakedown period for the HLW Vitrification System will begin with the initial introduction of dangerous waste in the HLW Vitrification System following construction and will end with the start of the demonstration test.

III.10.J.2.b.ii The shakedown period will not exceed the following limits, as defined by hours of operation, when the HLW Vitrification System is processing dangerous waste. The Permittees may petition Ecology for one (1) extension of each shakedown phase for seven hundred and twenty (720) additional operating hours in accordance with permit modification procedures specified in Permit Conditions III.10.C.2.e. and III.10.C.2.f.

Shakedown Phase 1: 720 hours

Shakedown Phase 2: 720 hours

III.10.J.2.b.iii Shakedown Phase 2 will not be commenced until documentation has been submitted to Ecology verifying that the HLW Vitrification System has operated at a minimum of 75% of the shakedown Phase 1 feed-rate limit for two (2) separate eight (8) consecutive hour periods with no AWFCOs.

III.10.J.2.c Allowable Waste Feed During the Shakedown Period

III.10.J.2.c.i The Permittees may feed the dangerous waste specified for the HLW Vitrification System on the Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those waste outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., except Permit Conditions III.10.J.2.c.ii. through v. also apply.

III.10.J.2.c.ii The Permittees will not feed the following waste to the HLW Vitrification System during Shakedown Phase 1:

A. Acutely toxic dangerous waste listed in WAC 173-303-081(a)(2)(a)(i).
B. Mixed waste

III.10.J.2.c.iii The Permittees will not feed the following waste to the HLW Vitrification System during Shakedown Phase 2:

A. Mixed waste

III.10.J.2.c.iv The feed-rates to the HLW Vitrification System will not exceed the limits in Permit Tables III.10.J.D and III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5.

III.10.J.2.c.v The Permittees will conduct sufficient analysis of the dangerous waste treated in the HLW Vitrification System to verify that the waste feed is within the physical and chemical composition limits specified in this Permit.

III.10.J.3 Demonstration Test Period [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)]

III.10.J.3.a Demonstration Test Period

III.10.J.3.a.i The Permittees will operate, monitor, and maintain the HLW Vitrification System as specified in Permit Condition III.10.J.1., and Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., except as modified in accordance with Permit Conditions III.10.J.1.b.xii. and III.10.J.3.

III.10.J.3.a.ii Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., will be re-submitted to Ecology for approval by the Permittees as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. at least one hundred and eighty (180) days prior to the start date of the demonstration test. The revised Demonstration Test Plan will include applicable EPA promulgated test methods and procedures in effect at the time of the re-submittal and projected commencement and completion dates for the Demonstration Test.

III.10.J.3.a.iii The Permittees will not commence the demonstration test period until documentation has been submitted to Ecology verifying that the HLW Vitrification System has operated at a minimum of 75% of the demonstration test period feed-rate limit for a minimum of an eight (8) consecutive hours period on two (2) consecutive days.

III.10.J.3.b Performance Standards

The Permittees will demonstrate compliance with the performance standards specified in Permit Condition III.10.J.1.b. during the Demonstration Test Period.

III.10.J.3.c Allowable Waste Feed During the Demonstration Test Period

III.10.J.3.c.i The Permittees may feed the dangerous waste specified for the HLW Vitrification System in Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those waste outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., except Permit Conditions III.10.J.3.c.ii. through iv. also apply.

III.10.J.3.c.ii The Permittees will not feed mixed waste to the HLW Vitrification System.

III.10.J.3.c.iv. The dangerous waste feed-rates to the HLW Vitrification System will not exceed the limits in Permit Tables III.10.J.D and F, as approved/modified pursuant to Permit Condition III.10.J.5.

III.10.J.3.c.v. The Permittees will conduct sufficient analysis of the dangerous waste treated in the HLW Vitrification System to verify that the dangerous waste is within the physical and chemical composition limits specified in this Permit.

III.10.J.3.d Demonstration Data Submissions and Certifications

III.10.J.3.d.i The Permittees will submit to Ecology a complete demonstration test report within one hundred and eighty (180) calendar days of completion of the Demonstration Test including all data collected during the Demonstration Test and updated Permit Tables III.10.K.D, III.10.K.E, and III.10.K.F.

III.10.J.3.d.ii The Permittees must submit the following information to Ecology prior to receiving Ecology's approval to commence feed of dangerous waste and mixed waste to the HLW Vitrification System:

A. The Permittees will submit a summary of data collected as required during the Demonstration Test to Ecology upon completion of the Demonstration Test.

B. A certification that the Demonstration Test has been carried out in accordance with the approved Demonstration Test Plan and approved modifications within thirty (30) days of the completion of the Demonstration Test [WAC 173-303-807(8)].

C. Calculations and analytical data showing compliance with the performance standards specified in Permit Conditions III.10.J.1.b.i, III.10.J.1.b.iv, III.10.J.1.b.v, III.10.J.1.b.vi, and III.10.J.1.b.vii

D. Laboratory data QA/QC summary for the information provided in III.10.J.3.d.ii.C.

III.10.J.3.d.iii After successful completion of the Demonstration Test and receipt of Ecology's approval, the Permittees will be authorized to commence feed of dangerous waste and mixed waste to the HLW Vitrification System for the post-demonstration test period indicated in Permit Tables III.10.J.D and F, as approved/modified pursuant to Permit Condition III.10.J.5., in compliance with the operating requirements specified in Permit Condition III.10.J.1.c. and within the limitations specified in Permit Condition.III.10.C.14.

III.10.J.3.d.iv RESERVED

III.10.J.3.d.v After successful completion of the Demonstration Test, Permittees submittal of the following to Ecology, and Permittees receipt of Ecology approval of the following in writing, the Permittees will be authorized to feed dangerous waste and mixed waste to the HLW Vitrification System pursuant to Permit Section III.10.K.

A. A complete Demonstration Test Report for the HLW Vitrification System and updated Permit Tables III.10.K.D, III.10.K.E, and III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10.C.11.c. or III.10.C.11.d., the test report will be certified in accordance with WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

B. A Final Risk Assessment Report completed pursuant to Permit Conditions III.10.C.11.c. or III.10.C.11.d.

III.10.J.3.d.vi If any calculations or testing results show that one or more of the performance standards listed in Permit Condition III.10.J.1.b., with the exception of Permit Condition III.10.J.1.b.x., for the HLW Vitrification System were not met during the Demonstration Test, the Permittees will perform the following actions:

A. Immediately stop dangerous and mixed waste feed to the HLW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).

B. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s) as specified in Permit Condition I.E.21.

C. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).

D. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s), documentation supporting a mode of operation where all performance standards listed in Permit Condition III.10.J.1.b., with the exception of Permit Condition III.10.J.1.b.x., for the HLW Vitrification System were met during the demonstration test, if any such mode was demonstrated.

E. Based on the information provided to Ecology by the Permittees, pursuant to Permit Conditions III.10.J.3.d.vi.A through D above, and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of a compliance schedule and/or revised Demonstration Test Plan, pursuant to Permit Conditions III.10.J.3.d.vi.F and G.

F. If the performance standard listed in Permit Condition III.10.J.1.b.i. was not met during the Demonstration Test, the Permittees will submit within one hundred and twenty (120) days of discovery of not meeting the performance standard, a revised Demonstration Test Plan (if appropriate) and a compliance schedule for Ecology approval to address this deficiency. If a revised Demonstration Test Plan is submitted, it will be accompanied by a request for approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. The revised Demonstration Test Plan (if submitted) must include substantive changes to prevent failure from reoccurring.

G. If any of the performance standards listed in Permit Condition III.10.J.1.b., with the exception of Permit Conditions III.10.J.1.b.i. or III.10.J.1.b.x., were not met during the Demonstration Test, the Permittees will submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s), a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

III.10.J.3.d.vii If any calculations or testing results show that any emission rate for any constituent listed in Permit Table III.10.J.E, as approved pursuant to Permit Condition III.10.C.11.b., is exceeded for HLW Vitrification System during the Demonstration Test, the Permittees will perform the following actions:

A. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.

B. Submit to Ecology additional risk information to indicate that the increased emissions impact is offset by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of exceeding the emission rate(s).

C. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or

III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

III.10.J.4 Post-Demonstration Test Period [WAC 173-303-670(5), WAC 173-303-670(6), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.4.a The Permittees will operate, monitor, and maintain the HLW Vitrification System as specified in Permit Condition III.10.J.1. and Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5., except as modified in accordance with Permit Conditions III.10.J.1.b.xii., III.10.J.3., and III.10.J.4.

III.10.J.4.b Allowable Waste Feed During the Post-Demonstration Test Period

III.10.J.4.b.i The Permittees may feed the dangerous and/or mixed waste specified for the HLW Vitrification System on the Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those waste outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., and except Permit Conditions III.10.J.4.b.ii. and III.10.J.4.b.iii. also apply.

III.10.J.4.b.ii The dangerous waste and mixed waste feed rates to the HLW Vitrification System will not exceed the limits in Permit Tables III.10.J.D and F, as approved/modified pursuant to Permit Condition III.10.J.5., or in Permit Condition III.10.J.3.

III.10.J.4.b.iii The Permittees will conduct sufficient analysis of the dangerous waste and mixed waste treated in HLW Vitrification System to verify that the waste feed is within the physical and chemical composition limits specified in this Permit.

III.10.J.5 Compliance Schedules

III.10.J.5.a All information identified for submittal to Ecology in a. through f. of this compliance schedule must be signed and certified in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.J.1.a.iii. [WAC 173-303-806(4)].

III.10.J.5.b The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to construction of each secondary containment and leak detection system for the HLW Vitrification System (per level) as identified in Permit Tables III.10.J.A and III.10.J.B, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 10.2, 10.4, 10.5, 10.7, 10.8, 10.9, 10.11, and 10.12 of this Permit. At a minimum, engineering information specified below will show the following as described in WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):

III.10.J.5.b.i IQRPE Reports (specific to foundation, secondary containment, and leak detection system) will include review of design drawings, calculations, and other information on which the certification report is based and will include, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 10.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. IQRPE Reports will be consistent with the information separately provided in ii. through ix. below [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.J.5.b.ii Design drawings (General Arrangement Drawings, plan) and specifications for the foundation, secondary containment including liner installation details, and leak detection methodology. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f) and WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.J.5.b.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the secondary containment system. This information will demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [WAC 173-303-640(4)(c)(ii), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.b.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.J.5.b.v Secondary containment/foundation, and leak detection system, materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials), as applicable [WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.J.5.b.vi Detailed description of how the secondary containment for the HLW Vitrification System will be installed in compliance with WAC 173-303-640(3)(c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B);

III.10.J.5.b.vii Submit Permit Tables III.10.J.B and III.10.K.B completed to provide for all secondary containment sumps and floor drains the information, as specified in each column heading consistent with information to be provided in i. through vi., above;

III.10.J.5.b.viii Documentation that secondary containment and leak detection systems will not accumulate hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.b.ix A detailed description of how HLW Vitrification System design provides access for conducting future HLW Vitrification System integrity assessments [WAC 173-303-640(3)(b) and WAC 173-303-806(4)(i)(i)(B)].

III.10.J.5.c The Permittees will submit to Ecology pursuant to Permit Condition III.10.C.9.f., prior to installation of each sub-system as identified in Permit Table III.10.J.A, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 10.1 through 10.14 and 10.17 of this Permit. At a minimum, engineering information specified below will show the following, as required pursuant to WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.J.5.c.i IQRPE Reports (specific to sub-system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 10.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information separately provided in ii. through xii. below and the IQRPE Report specified in Permit Condition III.10.J.5.b. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.J.5.c.ii Design drawings [General Arrangement Drawings in plan, Process Flow Diagrams, Piping and Instrumentation Diagrams, (including pressure control systems), Mechanical Drawings, and specifications, and other information specific to subsystems (to show location and physical attributes of each subsystem specific to miscellaneous units)] [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.J.5.c.iii Sub-system design criteria (references to codes and, standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details to support the sub-systems. Structural support calculations specific to off-specification, non-standard, and field-fabricated subsystems will be submitted for incorporation into the Administrative Record. Documentation will include, but not be limited to, supporting specifications (test data, treatment effectiveness report, etc.), supporting projected operational capability (e.g., WESP projected removal efficiency for individual metals, halogens, particulates, etc.), and compliance with performance standards specified in Permit Condition III.10.J.1.b [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.c.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.J.5.c.v Sub-system materials selection documentation (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.J.5.c.vi Sub-system vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.c.vii System descriptions related to sub-system units will be submitted for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.c.viii Mass and energy balance for normal projected operating conditions used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified for incorporation into the Administrative

Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.c.ix Detailed description of all potential HLW Vitrification System bypass events including:

A. A report which includes an analysis of credible potential bypass events and recommendations for prevention/minimization of the potential, impact, and frequency of the bypass event to include at a minimum:

1. Operating procedures
2. Maintenance procedures
3. Redundant equipment
4. Redundant instrumentation
5. Alternate equipment
6. Alternate materials of construction

III.10.J.5.c.x A detailed description of how the sub-systems will be installed in compliance with WAC 173-303-640(3)(b), (c), (d), and (e), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.J.5.c.xi Sub-system design to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW, for incorporation into the Administrative Record [WAC 173-303-640(5)(e), in accordance with WAC 173-303-680, (2), and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.c.xii Documentation that sub-systems are designed to prevent the accumulation of hydrogen gases levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.d The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of equipment for each sub-system as identified in Permit Tables III.10.J.A and III.10.J.B, not addressed in Permit Conditions III.10.J.5.b. or III.10.J.5.c., engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 10.1 through 10.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to in WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.J.5.d.i IQRPE Reports (specific to sub-system equipment) will include a review of design drawings, calculations, and other information as applicable on which the certification report is based. The reports will include, but not be limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 10.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information provided separately in ii. through xiii. below and the IQRPE Reports specified in Permit Conditions III.10.J.5.b. and III.10.J.5.c. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(I)(I)(A) through (B)];

III.10.J.5.d.ii Design drawings [Process Flow Diagrams, Piping and Instrumentation Diagrams (including pressure control systems), and specifications, and other information specific to equipment (these drawings should include all equipment such as pipes, valves, fittings, pumps, instruments, etc.)] [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.J.5.d.iii Sub-system equipment design criteria (references to codes and standards, load definitions and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the sub-system equipment. [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(f), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.d.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil and water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.J.5.d.v Materials selection documentation for equipment for each sub-system (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.J.5.d.vi Vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, for sub-system equipment will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(iv)];

III.10.J.5.d.vii Sub-system, sub-system equipment, and leak detection system instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.d.viii System description related to sub-system equipment, and system descriptions related to leak detection systems, for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.d.ix A detailed description of how the sub-system equipment will be installed and tested [WAC 173-303-640(3)(c) through (e) and WAC 173-303-640(4)(b) and (c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.d.x For process monitoring, control, and leak detection system instrumentation for the HLW Vitrification System as identified in Permit Tables III.10.J.C. and III.10.J. F., a detailed description of how the process monitoring, control, and leak detection system instrumentation will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), WAC 173-303-806(4)(c)(vi), and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.d.xi Mass and energy balance for projected normal operating conditions used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified, for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.d.xii Documentation that sub-systems equipment are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)] [WAC 173-303-815(2)(b)(ii)];

III.10.J.5.d.xiii Leak Detection system documentation (e.g. vendor information etc.) consistent with information submitted under Permit Condition III.10.J.5.c.ii. and Permit Conditions III.10.J.5.d.ii., vii., viii., and x. above, will be submitted for incorporation into the Administrative Record.

III.10.J.5.e Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following as specified below for incorporation into Operating Unit Group 10, Appendix 10.18 of this Permit, except Permit Condition III.10.J.5.e.i., which will be incorporated into Operating Unit Group 10, Addendum E of this Permit. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.J.5.b., c., d., e., and f., III.10.C.3.e.v., and III.10.C.11.b., as approved by Ecology:

III.10.J.5.e.i Integrity assessment program and schedule for the HLW Vitrification System will address the conducting of periodic integrity assessments on the HLW Vitrification System over the life of the system, as specified in Permit Condition III.10.J.5.b.ix. and as specified in WAC 173-303-640(3)(b), in accordance with WAC 173-303-680, and descriptions of procedures for addressing problems detected during integrity assessments. The schedule must be based on past integrity assessments, age of the system, materials of construction, characteristics of the waste, and any other relevant factors [WAC 173-303-640(3)(b), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.e.ii Detailed plans and descriptions, demonstrating the leak detection system is operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous and/or mixed waste or accumulated liquid in the secondary containment system within twenty-four (24) hours [WAC 173-303-640(4)(c)(iii)]. Detection of a leak of at least 0.1 gallons per hour within twenty-four (24) hours is defined as being able to detect a leak within twenty-four (24) hours. Any exceptions to this criteria must be approved by Ecology in accordance with WAC 173-303-680, WAC 173-303-640(4)(c)(iii), and WAC 173-303-806(4)(i)(i)(b);

III.10.J.5.e.iii Detailed operational plans and descriptions, demonstrating that spilled or leaked waste and accumulated precipitation liquids can be removed from the secondary containment system within twenty-four (24) hours [WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.e.iv Descriptions of operational procedures demonstrating appropriate controls and practices are in place to prevent spills and overflows from the HLW Vitrification System or containment systems in compliance with WAC 173-303-640(5)(b)(i) through (iii), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.J.5.e.v Description of procedures for investigation and repair of the HLW Vitrification System [WAC 173-303–640(6) and WAC 173-303-640(7)(e) and (f), in accordance with WAC 173-303-680, WAC 173-303-320, WAC 173-303-806(4)(ia)(iv), and WAC 173-303-806(4)(a)(ii)(B)];

III.10.J.5.e.vi Updated Addendum C, Narrative Description, Tables and Figures as identified in Permit Tables III.10.J.A and III.10.J.B, as modified pursuant to Permit Condition III.10.H.5.e.x. and updated to identify routinely non-accessible LAW Vitrification sub-systems.

III.10.J.5.e.vii Description of procedures for management of ignitable and reactive, and incompatible dangerous and/or mixed waste as specified in accordance with

WAC 173-303-640(9) and (10), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B).

III.10.J.5.e.viii A description of the tracking system used to track dangerous and/or mixed waste generated throughout the HLW Vitrification System, pursuant to WAC 173-303-380.

III.10.J.5.e.ix Permit Table III.10.J.C and III.10.K.C will be revised and/or completed for HLW Vitrification System process and leak detection system monitors and instruments (to include, but not be limited to: instruments and monitors measuring and/or controlling flow, pressure, temperature, density, pH, level, humidity, and emissions) to provide the information as specified in each column heading. Process and leak detection system monitors and instruments for critical systems, as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b.and for operating parameters as required to comply with Permit Condition III.10.C.3.e.iii., will be addressed. Process monitors and instruments for non-waste management operations (e.g., utilities, raw chemical storage, non-contact cooling waters, etc.) are excluded from this permit condition [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.e.x Permit Tables III.10.J.A and III.10.K.A amended as follows [WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)]:

A. Under column 1, update and complete list of dangerous and mixed waste HLW Vitrification System sub-systems, including plant items that comprise each system (listed by item number).

B. Under column 2, update and complete system designations.

C. Under column 3, replace the 'Reserved' with Operating Unit Group 10, Appendix 10.0 sub-sections (e.g., 10.1, 10.2, etc.) designated in Permit Conditions III.10.J.5.b., c., and d. specific to HLW Vitrification System sub-system, as listed in column 1.

D. Under column 4, update and complete list of narrative description, tables, and figures.

III.10.J.5.f One hundred and eighty (180) days prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit for review and receive approval for incorporation into Operating Unit Group 10, Appendix 10.15 of this Permit, a Demonstration Test Plan for the HLW Vitrification System to demonstrate that the HLW Vitrification Systems meets the performance standards specified in Permit Condition III.10.J.1.b. In order to incorporate the Demonstration Test Plan for the HLW Vitrification System into Operating Unit Group 10, Appendix 10.15, Permit Condition III.10.C.2.g. process will be followed. The Demonstration Test Plan will include, but not be limited to, the following information. The Demonstration Test Plan will also be consistent with the information provided pursuant to Permit Conditions III.10.J.5.b., c., d. and e., III.10.C.3.e.v. and III.10.C.11.b., as approved by Ecology and consistent with the schedule described in Operating Unit Group 10, Appendix 1.0 of this Permit. The documentation required pursuant to Permit Condition III.10.J.5.f.xvi., in addition to being incorporated into Operating Unit Group 10, Appendix 10.15, will be incorporated by reference in Operating Unit Group 10, Addendum E of this Permit.

Notes: (1) The following should be consulted to prepare this Demonstration Test Plan: "Guidance on Setting Permit Conditions and Reporting Trial Burn Results Volume II of the Hazardous Waste Incineration Guidance Series", and EPA/625/6-89/019 and Risk Burn Guidance For Hazardous Waste Combustion Facilities", EPA-R-01-001, July 2001, *WAC 173-303-807(2), WAC 173-303-670(5), WAC-173-303-670(6), 40 CFR §63.1207(f)(2), 40 CFR §63.1209 and Appendix to 40 CFR Part 63 EEE.*

(2) Cross-referencing to the information provided pursuant to permit Conditions III.H.5.b., c., d., e. and III.10.C.3.e.v., as approved by Ecology, that are redundant to elements of the Demonstration Test Plan for the HLW Vitrification System is acceptable.

III.10.J.5.f.i Analysis of each feed-stream to be fed during the demonstration test, including dangerous waste, glass formers and reductants, process streams (e.g., control air, process air, steam, sparge bubbler air, air in-leakage from melter cave, and gases from HLW Vitrification Vessel Ventilation System, process water, etc.) that includes:

A. Levels of ash, levels of metals, total chlorine (organic and inorganic), other halogens and radionuclide surrogates.

B. Description of the physical form of the feed-streams;

C. An identification and quantification of organics that are present in the feed-stream, including constituents proposed for DRE demonstration;

A comparison of the proposed demonstration test feed streams to the mixed waste feed envelopes to be processed in the melter must be provided that documents that the proposed demonstration test feed streams will serve as worst case surrogates for organic destruction, formation of products of incomplete oxidation, and metals, total chlorine (organic and inorganic), other halogens, particulate formation, and radionuclides;

III.10.J.5.f.ii Specification of trial principal organic dangerous constituents (PODCs) for which destruction and removal efficiencies are proposed to be calculated during the demonstration test and for inclusion in Permit Conditions III.10.J.1.b.i. and III.10.K.1.b.i. These trial PODCs will be specified based on destructibility, concentration or mass in the waste and the dangerous waste constituents or constituents in WAC 173-303-9905;

III.10.J.5.f.iii A description of the blending procedures, prior to introducing the feed-streams into the melter, including analysis of the materials prior to blending, and blending ratios;

III.10.J.5.f.iv A description of how the surrogate feeds are to be introduced for the demonstration. This description should clearly identify the differences and justify how any of differences would impact the surrogate feed introduction as representative of how mixed waste feeds will be introduced;

III.10.J.5.f.v A detailed engineering description of the HLW Vitrification System, including:

A. Manufacturer's name and model number for each sub-system.

B. Design capacity of each sub-system including documentation (engineering calculations, manufacturer/vendor specifications, operating data, etc.) supporting projected operational efficiencies (e.g., WESP projected removal efficiency for individual metals, halogens, particulates, etc.) and compliance with performance standards specified in Permit Condition III.10.J.1.b.

C. Detailed scaled engineering drawings, including Process Flow Diagrams, Piping and Instrumentation Diagrams, Vessel Drawings (plan, and elevation with cross sections) and General Arrangement Drawings.

D. Process Engineering Descriptions.

E. Mass and energy balances for each projected operating condition and each demonstration test condition, including assumptions and formulas used to complete mass and energy balances so that they can be independently verified for incorporation into the Administrative Record.

F. Engineering Specifications/data sheets (materials of construction, physical and chemical tolerances of equipment, equipment performance warranties, and fan curves).

G. Detailed Description of Automatic Waste Feed Cut-off System addressing critical operating parameters for all performance standards specified in Permit Condition III.10.J.1.b.

H. Documentation to support compliance with performance standards specified in Permit Condition III.10.J.1.b., including engineering calculations, test data, and manufacturer/vendor's warranties, etc.

I. Detailed description of the design, operation and maintenance practices for air pollution control system.

J. Detailed description of the design, operation, and maintenance practices of any stack gas monitoring and pollution control monitoring system.

III.10.J.5.f.vi Detailed description of sampling and monitoring procedures including sampling and monitoring locations in the system, the equipment to be used, sampling and monitoring frequency, and planned analytical procedures for sample analysis including, but not limited to:

A. A short summary narrative description of each stack sample method should be included within the main body of the demonstration test plan, which references an appendix to the plan that would include for each sampling train: (1) detailed sample method procedures, (2) sampling train configuration schematic, (3) sampling recovery flow sheet, (4) detailed analytical method procedures, and (5) sampling preparation and analysis flow sheet. The detailed procedures should clearly flag where the method has provided decision points (e.g., choices of equipment materials of construction, choices of clean-up procedures or whether additional clean-up procedures will be incorporated, whether pretest surveys or laboratory validation work will be performed, enhancements to train to accommodate high moisture content in stack gas, etc.) and what is being proposed along with the basis for the decision.

B. A short summary narrative description of the feed and residue sampling methods should be included within the main body of the demonstration test plan, which references an appendix that would include for each sample type: (1) detailed sample method procedures, (2) sampling recovery/compositing procedures, and (3) detailed analytical method procedures. The detailed procedures should clearly flag where the method has provided decision points (e.g., choices of equipment materials of construction, choices of clean-up procedures or whether additional clean-up procedures will be incorporated, whether pretest surveys or laboratory validation work will be performed, etc.) and what is being proposed along with the basis for the decision.

III.10.J.5.f.vii A detailed test schedule for each condition for which the demonstration test is planned, including projected date(s), duration, quantity of dangerous waste to be fed, and other relevant factors;

III.10.J.5.f.viii A detailed test protocol including, for each test condition, the ranges of feed-rate for each feed system, and all other relevant parameters that may affect the ability of the

HLW Vitrification System to meet performance standards specified in Permit Condition III.10.J.1.b.;

III.10.J.5.f.ix A detailed description of planned operating conditions for each demonstration test condition, including operating conditions for shakedown, demonstration test, post-demonstration test and normal operations. This information will also include submittal of Permit Tables III.10.J.D, III.10.J.F, III.10.K.D, and III.10.K.F completed with the information as specified in each column heading for each HLW Vitrification System waste feed cut-off parameter and submittal of supporting documentation for Permit Tables III.10.J.D, III.10.J.F, III.10.K.D, and III.10.K.F set-point values.

III.10.J.5.f.x The test conditions proposed must demonstrate meeting the performance standards specified in Permit Condition III.10.J.1.b. with the simultaneous operation of the melter at capacity and input from the HLW Vitrification Vessel Ventilation System at capacity to simulate maximum loading to the HLW Vitrification System off-gas treatment system and to establish the corresponding operating parameter ranges.

III.10.J.5.f.xi A detailed description of procedures for start-up and shutdown of waste feed and controlling emissions in the event of an equipment malfunction, including off-normal and emergency shutdown procedures;

III.10.J.5.f.xii A calculation of waste residence time;

III.10.J.5.f.xiii Any request to extrapolate metal feed-rate limits from Demonstration Test levels must include:

A. A description of the extrapolation methodology and rationale for how the approach ensures compliance with the performance standards, as specified in Permit Condition III.10.J.1.b.

B. Documentation of the historical range of normal metal feed-rates for each feed stream.

C. Documentation that the level of spiking recommended during the demonstration test will mask sampling and analysis imprecision and inaccuracy to the extent that extrapolation of feed-rates and emission rates from the Demonstration Test data will be as accurate and precise as if full spiking were used.

III.10.J.5.f.xiv Documentation of the expected levels of constituents in HLW Vitrification System input streams, including, but not limited to, waste feed, glass former and reactants, control air, process air, steam, sparge bubbler air, air in-leakage from melter cave, gases from HLW Vitrification Vessel Ventilation System, and process water.

III.10.J.5.f.xv Documentation justifying the duration of the conditioning required to ensure the HLW Vitrification System had achieved steady-state operations under Demonstration Test operating conditions.

III.10.J.5.f.xvi Documentation of HLW Vitrification System process and leak detection system instruments and monitors as listed on Permit Tables III.10.J.C, III.10.J.F, III.10.K.C, and III.10.K.F to include:

A. Procurement specifications.

B. Location used.

C. Range, precision, and accuracy.

D. Calibration/functionality test procedures (either method number ASTM) or provide a copy of manufacturer's recommended calibration procedures.

E. Calibration/functionality test, inspection, and routine maintenance schedules and checklists, including justification for calibration, inspection and maintenance frequencies, criteria for identifying instruments found to be significantly out of calibration, and corrective action to be taken for instruments found to be significantly out of calibration (e.g., increasing frequency of calibration, instrument replacement, etc.).

F. Equipment instrument control logic narrative description (e.g., descriptions of failsafe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)]

III.10.J.5.f.xvii Outline of demonstration test report.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
HLW Melter Process System HMP-MLTR-00001 (HLW Melter 1) HMP-MLTR-00002 (HLW Melter 2)	HMP	-M6-HMP-00001001, Rev 0 -M6-HMP-00001002, Rev 1 -M6-HMP-00003001, Rev 0 -M6-HMP-00004001, Rev 1 -M6-HMP-00006001, Rev 1 -M6-HMP-00006002, Rev 0 -M6-HMP-00007001, Rev 0 -M6-HMP-00008001, Rev 0 -M6-HMP-00013002, Rev 1 -M6-HMP-00013003, Rev 0 -M6-HMP-20001001, Rev 0 -M6-HMP-20001002, Rev 0 -M6-HMP-20003001, Rev 0 -M6-HMP-20004001, Rev 0 -M6-HMP-20006001, Rev 0 -M6-HMP-20008001, Rev 0 -M6-HMP-20013002, Rev 0 -M6-HMP-20013003, Rev 0 -M5-V17T-P0002, Rev 1 -M5-V17T-P20002, Rev 1 -M0D-HMP-00001, Rev 2 -M0D-HMP-00002, Rev 2 -MF-HMP-00001, Rev 0 -MF-HMP-00002, Rev 0 -MF-HMP-00003, Rev 0 -N1D-HMP-P0001, Rev 0 -P1-P01T-00002, Rev 7 -3PS-AE00-T0001, Rev 5	Section 4.1.4.2; Table C-8; and Figures C1-1, C1-4, C1-27 and C1-54 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System HOP-FCLR-00001 (Melter 1 Offgas Film Cooler) HOP-FCLR-00002 (Melter 2 Offgas Film Cooler)	HOP	**24590-HLW** -M5-V17T-P0002, Rev1 -M5-V17T-P20002, Rev 1 -M6-HMP-00002001, Rev 0 -M6-HMP-00002002, Rev 0 -M6-HMP-20002001, Rev 0 -M6-HMP-20002001, Rev 0	Section 4.1.4.3; Table C-8; and Figures C1-1, C1-4 and C1-27-in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
HOP-FCLR-00003 (Melter 1 Standby Offgas Insert) HOP-FCLR-00004 (Melter 2 Standby Offgas Insert)		-3YD-HOP-00001[a]	
Melter Offgas Treatment Process System (Cont.) HOP-SCB-00001 (Melter 1 Submerged Bed Scrubber, SBS) HOP-SCB-00002 (Melter 2 Submerged Bed Scrubber, SBS)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00001001, Rev 0 -M6-HOP-00001002, Rev 0 -M6-HOP-00001003, Rev 0 -M6-HOP-20001001, Rev 0 -M6-HOP-20001002, Rev 0 -M6-HOP-20001003, Rev 0 -MKD-HOP-P0016, Rev 0 -MK-HOP-P0001001, Rev 0 -MK-HOP-P0001002, Rev 0 -MK-HOP-P0001003, Rev 0 -MK-HOP-P0001004, Rev 0 -N1D-HOP-P0010, Rev 0 -P1-P01T-00002, Rev 7 -3YD-HOP-00001[a] **24590-WTP** -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-WESP-00001 (Melter 1 Wet Electrostatic Precipitator, WESP) HOP-WESP-00002 (Melter 2 Wet Electrostatic Precipitator, WESP)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00002, Rev 5 -M6-HOP-20002, Rev 6 -N1D-HOP-P0002, Rev 0 -P1-P01T-00004, Rev 7 -P1-P01T-00005, Rev 6 -3YD-HOP-00001[a]	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
		24590-WTP -3PS-MKE0-T0001, Rev 5	
Melter Offgas Treatment Process System (Cont.) HOP-HEPA-00001A (Melter 1 Primary Offgas HEPA Filter) HOP-HEPA-00001B (Melter 1 Primary Offgas HEPA Filter) HOP-HEPA-00002A (Melter 1 Secondary Offgas HEPA Filter) HOP-HEPA-00002B (Melter 1 Secondary Offgas HEPA Filter) HOP-HEPA-00007A (Melter 2 Primary Offgas HEPA Filter) HOP-HEPA-00007B (Melter 2 Primary Offgas HEPA Filter) HOP-HEPA-00008A (Melter 2 Secondary Offgas HEPA Filter) HOP-HEPA-00008B (Melter 2 Secondary Offgas HEPA Filter)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00010, Rev 3 -M6-HOP-20010, Rev 4 -MAD-HOP-00010, Rev 5 -MAD-HOP-00011, Rev 5 -MAD-HOP-00012, Rev 5 -MAD-HOP-00013, Rev 5 -MAD-HOP-00014, Rev 5 -MAD-HOP-00015, Rev 5 -MAD-HOP-00016, Rev 5 -MAD-HOP-00017, Rev 5 -P1-P01T-00002, Rev 7 -3YD-HOP-00001[a] **24590-WTP** -3PS-MKH0-T0002, Rev 4	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-ADBR-00001A (Melter 1Activated Carbon Adsorber – located on Activated Carbon Adsorber Skid HOP-ADBR-00001) HOP-ADBR-00001B (Melter 1 Activated Carbon Adsorber – located	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00003001, Rev 0 -M6-HOP-00003002, Rev 0 -M6-HOP-20003001, Rev 0 -M6-HOP-20003002, Rev 0 -MVD-HOP-00015, Rev 3 -MVD-HOP-00016, Rev 3	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
on Activated Carbon Adsorber Skid HOP-ADBR-00001) HOP-ADBR-00002A (Melter 2 Activated Carbon Adsorber – located on Activated Carbon Adsorber Skid HOP-ADBR-00002) HOP-ADBR-00002B (Melter 2 Activated Carbon Adsorber – located on Activated Carbon Adsorber Skid HOP-ADBR-00002)		-N1D-HOP-00003, Rev 1 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-MWK0-T0001, Rev 5	
Melter Offgas Treatment Process System (Cont.) HOP-HEME-00001A (Melter 1 High Efficiency Mist Eliminator, HEME) HOP-HEME-00001B (Melter 1 High Efficiency Mist Eliminator, HEME) HOP-HEME-00002A (Melter 2 High Efficiency Mist Eliminator, HEME) HOP-HEME-00002B (Melter 2 High Efficiency Mist Eliminator, HEME)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00009001, Rev 0 -M6-HOP-00009002, Rev 0 -M6-HOP-20009001, Rev 0 -M6-HOP-20009002, Rev 0 -MVD-HOP-00007, Rev 5 -MV-HOP-P0002001, Rev 0 -MV-HOP-P0002002, Rev 0 -MV-HOP-P0002003, Rev 0 -N1D-HOP-P0001, Rev 0 -P1-P01T-00002, Rev 7 -3YD-HOP-00001[a]	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-SCO-00001 (Thermal Catalytic Oxidizer – located on Catalyst SkidHOP-SKID-00005) HOP-SCO-00004 (Thermal Catalytic Oxidizer – located on Catalyst Skid HOP-SKID-00007)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001,Rev 0 -M6-HOP-00008002,Rev 0 -M6-HOP-00008003,Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-P0019, Rev 0 -MKD-HOP-P0020, Rev 0	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
		-N1D-HOP-00004, Rev 5 -NID-HOP-00005, Rev 5 -P1-PO1T-00002, Rev 7 -3PS-MBTV-T0002, Rev 1 **24590-LAW** -3PS-MBTV-T0001, Rev 5	
Melter Offgas Treatment Process System (Cont.) HOP-SCR-00001 (NOx Selective Catalytic Reducer – located on Catalyst Skid HOP-SKID-00005) HOP-SCR-00002 (NOx Selective Catalytic Reducer – located on Catalyst Skid HOP-SKID-00007)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-P0019, Rev 0 -MKD-HOP-P0020, Rev 0 -N1D-HOP-00004, Rev 5 -N1D-HOP-00005, Rev 5 -P1-PO1T-00002, Rev 7 -3PS-MBTV-T0002, Rev 1 **24590-LAW** -3PS-MBTV-T0001, Rev 5	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-HX-00001 (Catalyst Skid Preheater – located on Catalyst Skid HOP-SKID-00005) HOP-HX-00003 (Catalyst Skid Preheater – located on Catalyst Skid HOP-SKID-00007)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-P0019, Rev 0 -MKD-HOP-P0020, Rev 0 -N1D-HOP-00008, Rev 2 -P1-PO1T-P0002, Rev 7	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
		-3PS-MBTV-T0002, Rev 1 **24590-LAW** -3PS-MBTV-T0001, Rev 5	
Melter Offgas Treatment Process System (Cont.) HOP-HTR-00001 (Catalyst Skid Electric Heater – located on Catalyst Skid HOP-SKID-00005) HOP-HTR-00007 (Catalyst Skid Electric Heaters – located on Catalyst Skid HOP-SKID-00007)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-P0019, Rev 0 -MKD-HOP-P0020, Rev 0 -P1-PO1T-00002, Rev 7 -3PS-MBTV-T0002, Rev 1 -N1D-HOP-00011, Rev 0 **24590-LAW** -3PS-MBTV-T0001, Rev 5	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-ABS-00002 (Silver Mordenite Column) HOP-ABS-00003 (Silver Mordenite Column)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-00014, Rev 5 -MKD-HOP-00017, Rev 7 -NID-HOP-P0006, Rev 1 -P1-P01T-00001, Rev 9 -3PS-MBT0-TP001, Rev 2	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
Melter Offgas Treatment Process System (Cont.) HOP-HTR-00001B (HEPA Preheater) HOP-HTR-00002A (HEPA Preheater) HOP-HTR-00005A (HEPA Preheater) HOP-HTR-00005B (HEPA Preheater)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00010, Rev 3 -M6-HOP-20010, Rev 4 -MED-HOP-00013, Rev 4 -3PS-MEE0-T0001, Rev 1	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-HX-00002 (Silver Mordenite Preheater) HOP-HX-00004 (Silver Mordenite Preheater)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00003001, Rev 0 -M6-HOP-00003002, Rev 0 -M6-HOP-20003001, Rev 0 -M6-HOP-20003002, Rev 0 -N1D-HOP-00007, Rev 1 -P1-P01T-00002, Rev 7	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-FAN-00001A (Booster Extraction Fan) HOP-FAN-00001B (Booster Extraction Fan) HOP-FAN-00001C (Booster Extraction Fan) HOP-FAN-00009A (Booster Extraction Fan)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00003001, Rev 0 -M6-HOP-00003002, Rev 0 -M6-HOP-20003001, Rev 0 -M6-HOP-20003002, Rev 0 -MAD-HOP-P0018, Rev 2 -P1-P01T-00001, Rev 9 **24590-WTP** -3PS-MACS-TP004, Rev 0	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
HOP-FAN-00009B (Booster Extraction Fan) HOP-FAN-00009C (Booster Extraction Fan)			
<u>Melter Offgas Treatment Process System (Cont.)</u> HOP-FAN-00008A (Stack Extraction Fan) HOP-FAN-00008B (Stack Extraction Fan) HOP-FAN-00008C (Stack Extraction Fan) HOP-FAN-000010A (Stack Extraction Fan) HOP-FAN-000010B (Stack Extraction Fan) HOP-FAN-000010C (Stack Extraction Fan)	HOP	**<u>24590-HLW</u>** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MAD-HOP-00038, Rev 5 -P1-P01T-00005, Rev 6 **<u>24590-WTP</u>** -3PS-MACS-TP004, Rev 0	Section 4.1.4.3; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
<u>Melter Offgas Treatment Process System (Cont.)</u> HLW Stack	HOP	**<u>24590-HLW</u>** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0	Section 4.1.4.3; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
<u>Pulse Jet Ventilation System</u> PJV-HTR-00002 (Pulse Jet Ventilation HEPA Electric Preheater)	PJV	**<u>24590-HLW</u>** -M6-PJV-00001001, Rev 0 -M6-PJV-00002001, Rev 0	

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
PJV-HEPA-00004B (PJV System HEPA Filter (Standby Primary)) PJV-HEPA-00005B (PJV System HEPA Filter (Standby Secondary)) PJV-HEPA-00004A (PJV System HEPA Filter (Primary)) PJV-HEPA-00005A (PJV System HEPA Filter (Secondary)) PJV-FAN-00002A (Pulse Jet Vent Extraction Fan) PJV-FAN-00002B (Pulse Jet Vent Extraction Fan)			
Process Vessel Vent Extraction System PVV system contains ancillary equipment only.	PVV	**24590-HLW** -M6-PVV-00001, Rev 4 -M6-PVV-20001, Rev 2	
[a]System Descriptions are maintained in the Administrative Record, and are listed here for information only.			

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Table III.10.J.B – HLW Vitrification Systems Secondary Containment Systems Including Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[a] (feet) & Materials of Construction	Maximum Allowable Liquid Height (inches)	Secondary Containment Volume (gallons)	Engineering Description (Drawing Nos., Specification Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

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Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-00004001, Rev 1	Melter 1 plenum temperature, 62”	TBD	(TE-0920A + TT-0920A + TI-0920A)* Or (TE-0920C + TT-0921A + TI-0921F)*	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00004001, Rev 1	Melter 1 plenum temperature, 59”	TBD	(TE-0920B + TT-920A + TI-0920B)* Or (TE-920D + TT-0921A+ TI-0921E)*	TBD	TBD	TBD	TBD	TBD

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-20004001, Rev 0	Melter 2 plenum temperature, 62"	TBD	(TE-2920A + TT-2920A + TI-2920A)* Or (TE-2920C + TT-2921A + TI-2920C)*	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20004001, Rev 0	Melter 2 plenum temperature, 59"	TBD	(TE-2920B + TT-2920A + TI-2920B)* Or (TE-2920D + TT-2921A + TI-2920D)*	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00013002, Rev 1 24590-HLW-M6-HMP-00013003, Rev 0	Melter 1 glass pool density	TBD	DT-0132 DI-0132	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00013002, Rev 1 24590-HLW-M6-HMP-00013003, Rev 0	Melter 1 glass pool level	TBD	LT-0131 LI-0131	TBD	TBD	TBD	TBD	TBD

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-20013002, Rev 0 24590-HLW-M6-HMP-20013003, Rev 0	Melter 2 glass pool density	TBD	DT-2132 DI-2132	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20013002, Rev 0 24590-HLW-M6-HMP-20013003, Rev 0	Melter 2 glass pool level	TBD	LT-2131 LI-2131	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00013002, Rev 1 24590-HLW-M6-HMP-00013003, Rev 0	Melter 1 plenum pressure	TBD	(PDT-0139A + PDI-0139A)* Or (PDT-0139B + PDI-0139B)*	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20013002, Rev 0 24590-HLW-M6-HMP-20013003, Rev 0	Melter 2 plenum pressure	TBD	(PDT-2139A + PDI-2139A)* Or (PDT-2139B + PDI-2139B)*	TBD	TBD	TBD	TBD	TBD

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-00008001, Rev 0 24590-HLW-M6-HMP-00008002, Rev 0	Melter 1 West canister level	TBD	LT-0816 (LI-0816A Or LI-0816B)**	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00007001, Rev 0	Melter 1 West Discharge Air Lift	TBD	YC-0761 YV-0761	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00008001, Rev 0 24590-HLW-M6-HMP-00008002, Rev 0	Melter 1 East canister level	TBD	LT-0820 (LI-0820A Or LI-0820B)**	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00006001, Rev 1 24590-HLW-M6-HMP-00006002, Rev 0	Melter 1 East Discharge Air Lift	TBD	YC-0664 YV-0664	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20008001, Rev 0 24590-HLW-M6-HMP-20008002, Rev 0	Melter 2 West canister level	TBD	LT-2816 (LI-2816A Or LI-2816B)**	TBD	TBD	TBD	TBD	TBD

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-20007001, Rev 0	Melter 2 West Discharge Air Lift	TBD	YC-2761 YV-2761	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20008001, Rev 0 24590-HLW-M6-HMP-20008002, Rev 0	Melter 2 East canister level	TBD	LT-2820 (LI-2820A Or LI-2820B)**	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20006001, Rev 0	Melter 2 East Discharge Air Lift	TBD	YC-2664 YV-2664	TBD	TBD	TBD	TBD	TBD
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

*These instrument sets are duplicates. Only one instrument set is required to remain functioning during waste feed operations.

**These instruments are duplicates. Only one instrument is required to remain functioning during waste feed operations.

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Table III.10.J.D – Maximum Feed-Rates to HLW Vitrification System (RESERVED)

Description of Waste	Shakedown 1	Shakedown 2, Demonstration Test and Post Demonstration Test
Dangerous and Mixed Waste Feed Rate	RESERVED	RESERVED
Ash Feed Rate	RESERVED	RESERVED
Total Chlorine/Chloride Feed Rate	RESERVED	RESERVED
Total Metal Feedrates	RESERVED	RESERVED

Table III.10.J.E – HLW Vitrification System Estimated Emission Rates (RESERVED)

Chemicals	CAS Number	Emission Rates (grams/second)
RESERVED	RESERVED	RESERVED

Table III.10.J.F. - HLW Vitrification System Waste Feed Cut-off Parameters* (RESERVED)

Subsystem Designation	Instrument Tag Number	Parameter Description	Setpoints During Shakedown 1 and Post Demonstration Test	Setpoints During Shakedown 2 and Demonstration Test
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

*A continuous monitoring system will be used as defined in Permit Section III.10.C.1.

[1]Maximum Feed-rate will be set based on not exceeding any of the constituent (e.g., metals, ash, and chlorine/chloride) feed limits specified on Table III.10.J.D. of this Permit

III.10.K HLW VITRIFICATION SYSTEM – LONG TERM MISCELLANEOUS THERMAL TREATMENT UNIT

For purposes of Permit Section III.10.K, where reference is made to WAC 173-303-640, the following substitutions apply: substitute the terms "HLW Vitrification System" for "tank system(s)," "sub-system(s)" for "tank(s)," "sub-system equipment" for "ancillary equipment," and "sub-system(s) or sub-system equipment of a HLW Vitrification System" for "component(s)," in accordance with WAC 173-303-680.

III.10.K.1 Requirements For HLW Vitrification System Beginning Normal Operation

Prior to commencing normal operations provided in Permit Section III.10.K, all requirements in Permit Section III.10.J will have been met by the Permittees and approved by Ecology, including the following: The HLW Vitrification System Demonstration Test results and the revised Final Risk Assessment provided for in Permit Conditions III.10.C.11.c. or d. and Permit Section III.10.J, will have been evaluated and approved by Ecology, Permit Tables III.10.K.D and F, as approved/modified pursuant to Permit Condition III.10.J.5, will have been completed, submitted and approved pursuant to Permit Condition III.10.J.3.d.v. and Permit Table III.10.K.E, as approved/modified pursuant to Permit Condition III.10.J.5, will have been completed, submitted and approved pursuant to Permit Conditions III.10.C.11.c. or d.

III.10.K.1.a Construction and Maintenance [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-340]

III.10.K.1.a.i The Permittees will maintain the design and construction of the HLW Vitrification System as specified in Permit Condition III.10.K.1, Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 10.1 through 10.17 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.a. through d. and III.10.J.5.f.

III.10.K.1.a.ii The Permittees will maintain the design and construction of all containment systems for the HLW Vitrification System as specified in Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 10.2 and 10.4 through 10.14 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.a. through d.

III.10.K.1.a.iii Modifications to approved design, plans, and specifications in Operating Unit Group 10, of this Permit, for the HLW Vitrification System will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., e., and h.

III.10.K.1.a.iv The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer; registered, professional engineer; independent corrosion expert; independent, qualified installation inspector; installation inspector; etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new HLW Vitrification system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following HLW Vitrification system components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs [i.e., (a) through (g)]), in accordance with WAC 173-303-680.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

III.10.K.1.a.v The Permittees will ensure periodic integrity assessments are conducted on the HLW Vitrification System listed in Permit Table III.10.I.A, as approved/modified pursuant to Permit Condition III.10.J.5, over the term of this Permit, in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(3)(b) following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.K.1.a.vi The Permittees will address problems detected during the HLW Vitrification System integrity assessments specified in Permit Condition III.10.K.1.a.v. following the description of the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c.

III.10.K.1.a.vii All process monitors/instruments as specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Condition III.10.J.5 and III.10.J.3.d.v., will be equipped with operational alarms to warn of deviation, or imminent deviation from the limits specified in Permit Table III.10.K.F.

III.10.K.1.a.viii The Permittees will install and test all process and leak detection system monitors/instruments, as specified in Permit Tables III.10.K.C and III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10.J.3.d.v., in accordance with Operating Unit Group 10, Appendices 10.1, 10.2, and 10.14 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.d.x. and III.10.J.5.f.xvi.

III.10.K.1.a.ix No dangerous and/or mixed waste will be treated in the HLW Vitrification System unless the operating conditions, specified under Permit Condition III.10.K.1.c. are complied with.

III.10.K.1.a.x The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the HLW Vitrification System if these substances could cause the sub-system, sub-system equipment, or the containment system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)]. This condition is not applicable to corrosion of HLW Vitrification System sub-system or sub-system equipment that are expected to be replaced as part of normal operations (e.g., melter).

III.10.K.1.a.xi The Permittees will operate the HLW Vitrification System to prevent spills and overflows using the description of controls and practices as required under WAC 173-303-640(5)(b), described in Permit Condition III.10.C.5, and Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3), WAC-173-303-806(4)(c)(ix)].

III.10.K.1.a.xii For routinely non-accessible HLW Vitrification System sub-systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit

Condition III.10.J.5.e.vi., the Permittees will mark all routinely non-accessible HLW Vitrification System sub-systems access points with labels or signs to identify the waste contained in each HLW Vitrification System sub-system. The label, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the HLW Vitrification System sub-systems. For the purposes of this permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.K.1.a.xiii For all the HLW Vitrification System sub-systems not addressed in Permit Condition III.10.K.1.a.xii., the Permittees will mark all these HLW Vitrification System sub-systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the HLW Vitrification System sub-systems. The labels, or signs, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the HLW Vitrification System sub-systems [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.K.1.a.xiv The Permittees will ensure that the secondary containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10.K.A and III.10.K.B, as approved/modified pursuant to Permit Condition III.10.J.5, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during the use of the HLW Vitrification System sub-systems. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303-640(4)(e)(i)(C), and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.K.1.a.xv The Permittees must immediately and safely remove from service any HLW Vitrification System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Condition III.10.K.1.a.xvii.A through D, and F. The affected HLW Vitrification System or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.K.1.a.xvii.E. [WAC 173-303-640(7)(e) and (f) and WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.K.1.a.xvi An impermeable coating, as specified in Operating Unit Group 10, Appendices 10.4, 10.5, 10.7, 10.9, 10.11, and 10.12 of this Permit, as approved pursuant to Permit Condition III.10.J.5.b.v., will be maintained for all concrete containment systems and concrete portions of containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10. K.A and III.10.K.B, as approved/modified pursuant to Permit Condition III.10.J.5 (concrete containment systems that do not have a liner, pursuant to WAC 173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2). The coating will prevent migration of any dangerous and/or mixed waste into the concrete. All coatings will meet the following performance standards:

A. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present;

B. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and/or mixed waste could migrate from the system; and

C. The coating must be compatible with the dangerous and/or mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(i)(i)(A)].

III.10.K.1.a.xvii The Permittees will inspect all secondary containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10.K.A and III.10.K.B, as approved/modified pursuant to Permit Condition III.10.J.5., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c), WAC 173-303-640(6) in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)]:

A. Immediately, and safely, stop the flow of dangerous and/or mixed waste into the HLW Vitrification System sub-systems or secondary containment system.

B. Determine the source of the dangerous and/or mixed waste.

C. Remove the dangerous and/or mixed waste from the containment area in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(b). The dangerous and/or mixed waste removed from containment areas of the HLW Vitrification System will be, at a minimum, managed as mixed waste.

D. If the cause of the release was a spill that has not damaged the integrity of the HLW Vitrification System sub-system, the Permittees may return the HLW Vitrification System sub-system to service in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(e)(ii). In such case, the Permittees will take action to ensure the incident that caused the dangerous and/or mixed waste to enter the containment system will not reoccur.

E. If the source of the dangerous and/or mixed waste is determined to be a leak in from the primary HLW Vitrification System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees will comply with the requirements of WAC 173-303-640(7) and take the following actions:

1. Close the HLW Vitrification System sub-system following procedures in WAC 173-303-640(7)(e)(i), in accordance with WAC 173-303-680, and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

2. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.K.1.a.iii.) the HLW Vitrification System, in accordance with Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e.v.,

before the HLW Vitrification System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

F. The Permittees will document in the operating record actions/procedures taken to comply with A through E above, as specified in WAC 173-303-640(6)(d), in accordance with WAC 173-303-680(2) and (3).

G. In accordance with WAC 173-303-680(2) and (3), the Permittees will notify and report releases to the environment to Ecology as specified in WAC 173-303-640(7)(d).

III.10.K.1.a.xviii If liquids (e.g., dangerous and/or mixed waste, leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours; Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C, listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal.

B. Measures implemented to ensure continued protection of human health and the environment.

C. Current actions being taken to remove liquids from secondary containment.

III.10.K.1.a.xix All air pollution control devices and capture systems in the HLW Vitrification System will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the air pollution control devices and capture systems in the HLW Vitrification System are properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.K.1.a.xx In all future narrative permit submittals, the Permittees will include HLW Vitrification sub-system names with the sub-system designation.

III.10.K.1.a.xxi For any portion of the HLW Vitrification System which has the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.K.1.a.xxii For each HLW Vitrification System sub-system holding dangerous waste which are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes, or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e), in accordance with WAC 173-303-680].

III.10.K.1.b Performance Standards

III.10.K.1.b.i The HLW Vitrification System must achieve a destruction and removal efficiency (DRE) of 99.99% for the principal organic dangerous constituents (PODCs) listed below [40 CFR §63.1203(c)(1) and 40CFR §63.1203(c)(2), in accordance with WAC 173-303-680(2)]:

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DRE in this Permit Condition will be calculated in accordance with the formula given below:

$DRE=[1-(W_{out}/W_{in})] \times 100\%$

Where:

W_{in}=mass feed-rate of one principal organic dangerous constituent (PODC) in a waste feed stream; and

W_{out}=mass emission rate of the same PODC present in exhaust emissions prior to release to the atmosphere.

III.10.K.1.b.ii Particulate matter emissions from the HLW Vitrification System will not exceed 34 mg/dscm (0.015 grains/dscf) [40 CFR §63.1203(b)(7), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.iii Hydrochloric acid and chlorine gas emissions from the HLW Vitrification System will not exceed 21 ppmv, combined [40 CFR §63.1203(b)(6), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.iv Dioxin and Furan TEQ emissions from the HLW Vitrification System will not exceed 0.2 nanograms (ng)/dscm [40 CFR §63.1203(b)(1), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.v Mercury emissions from the HLW Vitrification System will not exceed 45 μg/dscm [40 CFR §63.1203(b)(2), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.vi Lead and cadmium emissions from the HLW Vitrification System will not exceed 120 μg/dscm, combined [40 CFR §63.1203(b)(3), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.vii Arsenic, beryllium, and chromium emissions from the HLW Vitrification System will not exceed 97 μg/dscm, combined [40 CFR §63.1203(b)(4), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.viii Carbon monoxide (CO) emission from the HLW Vitrification System will not exceed 100 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system), dry basis [40 CFR §63.1203(b)(5)(i), in accordance with WAC 173-303-680(2) and (3)];

III.10.K.1.b.ix Hydrocarbon emission from the HLW Vitrification System will not exceed 10 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system during demonstration testing required by this Permit), dry basis and reported as propane [40 CFR §63.1203(b)(5)(ii), in accordance with WAC 173-303-680(2) and (3)];

III.10.K.1.b.x If the emissions from the HLW Vitrification System exceed the emission rates listed in Permit Table III.10.K.E, as approved pursuant to Permit Condition III.10.C.11.c. or d., the Permittees will perform the following actions [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)]:

A. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.

B. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of exceeding the emission rate(s).

C. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

The emission limits specified in Permit Conditions III.10.K.1.b.i. through III.10.K.1.b.ix. above, will be met for the HLW Vitrification System by limiting feed rates as specified in Permit Tables III.10.K.D and III.10.K.F, as approved/modified pursuant to Permit Condition III.10.J.5 and III.10.J.3.d.v., compliance with operating conditions specified in Permit Condition III.10.K.1.c. (except as specified in Permit Condition III.10.K.1.b.xii.), and compliance with Permit Condition III.10.K.1.b.xi.

III.10.K.1.b.xi Treatment effectiveness, feed-rates, and operating rates for dangerous and/or mixed waste management units contained in the HLW Building, but not included in Permit Table III.10.K.A, as approved/modified pursuant to Permit Condition III.10.J.5, will be as specified in Permit Sections III.10.D, III.10.E, III.10.F and consistent with the assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Conditions III.10.C.11.c. or d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

III.10.K.1.b.xii Compliance with the operating conditions specified in Permit Condition III.10.K.1.c., will be regarded as compliance with the required performance standards identified in Permit Conditions III.10.K.1.b.i. through x. However, if it is determined that during the effective period of this Permit that compliance with the operating conditions in Permit Condition III.10.K.1.c. is not sufficient to ensure compliance with the performance standards specified in Permit Conditions III.10.K.1.b.i. through x., the Permit may be modified, revoked, or reissued pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g.

III.10.K.1.c Operating Conditions [WAC 173-303-670(6), in accordance with WAC 173-303-680(2)and (3)]

The Permittees will operate the HLW Vitrification System in accordance with Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.J.5.e.vi., Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e. and f., and Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., except as modified pursuant to Permit Conditions III.10.J.3, III.10.K.1.b.x., III.10.K.1.b.xii., III.10.K.1.h., and in accordance with and the following:

III.10.K.1.c.i The Permittees will operate the HLW Vitrification System in order to maintain the systems and process parameters listed in Permit Tables III.10.K.C and III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., within the set-points specified in Permit Table III.10.K.F.

III.10.K.1.c.ii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., to automatically cut-off and/or lock-out the dangerous and/or mixed waste feed to HLW Vitrification System when the monitored operating conditions deviate from the set-points specified in Permit Table III.10.K.F.

III.10.K.1.c.iii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., to automatically cut-off and/or lock-out the dangerous and/or mixed waste feed to HLW Vitrification System when all instruments specified on Permit Table III.10.I.F for measuring the monitored parameters fails or exceeds its span value.

III.10.K.1.c.iv The Permittees will operate the AWFCO systems, specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., to automatically cut-off and/or lock out the dangerous and/or mixed waste feed to the HLW Vitrification System when any portion of the HLW Vitrification System is bypassed. The terms "bypassed" and "bypass event" as used in Permit Sections III.10.J and K will mean if any portion of the HLW Vitrification System is bypassed so that gases are not treated as during the Demonstration Test.

III.10.K.1.c.v In the event of a malfunction of the AWFCO systems listed in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., the Permittees will immediately, manually, cut-off the dangerous and/or mixed waste feed to the HLW Vitrification System. The Permittees will not restart the dangerous and/or mixed waste feed until the problem causing the malfunction has been identified and corrected.

III.10.K.1.c.vi The Permittees will manually cut-off the dangerous and/or mixed waste feed to the HLW Vitrification System when the operating conditions deviate from the limits specified in Permit Condition III.10.K.1.c.i., unless the deviation automatically activates the waste feed cut-off sequence specified in Permit Conditions III.10.K.1.c.ii., iii., and/or iv.

III.10.K.1.c.vii If greater than thirty (30) dangerous and/or mixed waste feed cut-off, combined, to the HLW Vitrification System occur due to deviations from Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., within a sixty (60) day period, the Permittees will submit a written report to Ecology within five (5) calendar days of the thirty-first (31) exceedance including the information specified below. These dangerous and/or mixed waste feed cut-offs to the HLW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous and/or mixed waste and waste residues continue to be processed in the HLW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.K.F, from which the set-point is deviated:

A. The parameter(s) that deviated from the set-point(s) in Permit Table III.10.K.F;

B. The magnitude, dates, and duration of the deviations;

C. Results of the investigation of the cause of the deviations; and

D. Corrective measures taken to minimize future occurrences of the deviations.

III.10.K.1.c.viii If greater than thirty (30) dangerous and/or mixed waste feed cut-offs, combined, to the HLW Vitrification System occur due to deviations from Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., within a thirty (30) day period, the Permittees will submit the written report required to be submitted pursuant to Permit Condition III.10.K.1.c.vii. to Ecology, on the first business day following the thirty-first exceedance. These dangerous and/or mixed waste feed cut-offs to the HLW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous and/or mixed waste and waste residues continue to be processed in the HLW Vitrification System.

A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.K.F, from which the set-point is deviated:

In accordance with WAC 173-303-680(2) and (3), the Permittees may not resume dangerous and/or mixed waste feed to the HLW Vitrification System until this written report has been submitted; and

A. Ecology has authorized the Permittees, in writing, to resume dangerous and/or mixed waste feed, or

B. Ecology has not, within seven (7) days, notified the Permittees in writing of the following:

1. The Permittees written report does not document that the corrective measures taken will minimize future exceedances.

2. The Permittees must take further corrective measures and document that these further corrective measures will minimize future exceedances.

III.10.K.1.c.ix If any portion of the HLW Vitrification System is bypassed while treating dangerous and/or mixed waste, it will be regarded as non-compliance with the operating conditions specified in Permit Condition III.10.K.1.c. and the performance standards specified in Permit Condition III.10.K.1.b. After such a bypass event, the Permittees will perform the following actions:

A. Investigate the cause of the bypass event.

B. Take appropriate corrective measures to minimize future bypasses.

C. Record the investigation findings and corrective measures in the operating record.

D. Submit a written report to Ecology within five (5) days of the bypass event documenting the result of the investigation and corrective measures.

III.10.K.1.c.x The Permittees will control fugitive emissions from the HLW Vitrification System by maintaining the melter under negative pressure.

III.10.K.1.c.xi Compliance with the operating conditions specified in Permit Condition III.10.K.1.c. will be regarded as compliance with the required performance standards identified in Permit Condition III.10.K.1.b. However, evidence that compliance with these operating conditions is insufficient to ensure compliance with the performance standards, will justify modification, revocation, or re-issuance of this Permit, in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g.

III.10.K.1.d Inspection Requirements [WAC 173-303-680(3)]

III.10.K.1.d.i The Permittees will inspect the HLW Vitrification System in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.K.1.d.ii The inspection data for HLW Vitrification System will be recorded, and the records will be placed in the WTP Unit operating record for HLW Vitrification System, in accordance with Permit Condition III.10.C.4.

III.10.K.1.d.iii The Permittees will comply with the inspection requirements specified in Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.3, III.10.K.1.b.x., III.10.K.1.b.xii., and III.10.K.1.h.

III.10.K.1.e Monitoring Requirements [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(3)]

III.10.K.1.e.i Upon receipt of a written request from Ecology, the Permittees will perform sampling and analysis of the dangerous and/or mixed waste and exhaust emissions to verify that the operating requirements established in the permit achieve the performance standards delineated in this Permit.

III.10.K.1.e.ii The Permittees will comply with the monitoring requirements specified in the Operating Unit Group 10, Appendices 10.2, 10.3, 10.7, 10.13, 10.15, and 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5, and as modified by Permit Conditions III.10.J.3, III.10.K.1.h., and III.10.K.1.b.x. and xii.

III.10.K.1.e.iii The Permittees will operate, calibrate, and maintain the carbon monoxide and hydrocarbon continuous emission monitors (CEM) specified in this Permit in accordance with Performance Specifications 4B and 8A of 40 CFR Part 60, Appendix B, in accordance with Appendix to Subpart EEE of 40 CFR Part 63, and Operating Unit Group 10 Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit ConditionsIII.10.J.3, III.10.K.1.h., and III.10.K.1.b.x. and xii.

III.10.K.1.e.iv The Permittees will operate, calibrate, and maintain the instruments specified on Permit Tables III.10.K.C and F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., in accordance with Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.3, III.10.K.1.h., and III.10.K.1.b.x. and xii.

III.10.K.1.e.v The Permittees shall calibrate, inspect, and maintain or replace the following cooling water flow and temperature instruments: (Melter 1: FT/FI-0306, FT/FI-0316, FT/FI-0321, FT/FI-0326, FT/FI-0336, TE/TT/TI-0352; Melter 2: FT/FI-2306, FT/FI-2316, FT/FI-2321, FT/FI-2326, FT/FI-2336, TE/TT/TI-2352) in accordance with manufacturer's recommendations.

III.10.K.1.f Recordkeeping Requirements [WAC 173-303-380 and WAC 173-303-680(3)]

III.10.K.1.f.i The Permittees will record and maintain in the WTP Unit operating record for the HLW Vitrification System, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4 and 5 as modified by Permit Conditions III.10.J.3, III.10.K.1.h., and III.10.K.1.b.x. and xii.

III.10.K.1.f.ii The Permittees will record in the WTP Unit operating record the date, time, and duration of all automatic waste feed cut-offs and/or lockouts, including the triggering parameters, reason for the deviation, and recurrence of the incident. The Permittees will also record all incidents of AWFCO system function failures, including the corrective measures taken to correct the condition that caused the failure.

III.10.K.1.f.iii The Permittees will submit to Ecology an annual report each calendar year within ninety (90) days following the end of the year. The report will include the following information:

A. Total dangerous and/or mixed waste feed processing time for the HLW Vitrification System.

B. Date/Time of all HLW Vitrification System startups and shutdowns.

C. Date/Time/Duration/Cause/Corrective Action taken for all HLW Vitrification System shutdowns caused by malfunction of either process or control equipment.

D. Date/Time/Duration/Cause/Corrective Action taken for all instances of dangerous and/or mixed waste feed cut-off due to deviations from Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10J.3.d.v.

III.10.K.1.f.iv The Permittees will submit an annual report to Ecology each calendar year within ninety (90) days following the end of the year of all quarterly CEM Calibration Error and Annual CEM Performance Specification Tests conducted in accordance with Permit Condition III.10.K.1.e.iii.

III.10.K.1.f.v The Permittees shall maintain operating and calibration/maintenance records for Ecology's inspection for the following cooling water flow and temperature instruments (Melter 1: FT/FI-0306, FT/FI-0316, FT/FI-0321, FT/FI-0326, FT/FI-0336, TE/TT/TI-0352; Melter 2: FT/FI-2306, FT/FI-2316, FT/FI-2321, FT/FI-2326, FT/FI-2336, TE/TT/TI-2352).

III.10.K.1.f.vi The Permittees shall maintain refractory thermocouple temperature data for Ecology inspection.

III.10.K.1.g Closure

The Permittees will close the HLW Vitrification System in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.K.1.h Periodic Emission Re-testing Requirements [WAC 173-303-670(5), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.K.1.h.i Dioxin and Furan Emission Testing

A. Within eighteen (18) months of commencing operation pursuant to Permit Section III.10.K, the Permittees will submit to Ecology for approval, a Dioxin and Furan Emission Test Plan (DFETP) for the performance of emission testing of the HLW Vitrification System gases for dioxin and furans during "Normal Operating Conditions" as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. The DFETP will include all elements applicable to dioxin and furan emission testing included in the "Previously Approved Demonstration Test Plan," applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for dioxin and furan emission test. "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified on Permit Table III.10.K.F

(as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10.J.3.d.v), that were established to maintain compliance with Permit Condition III.10.K.1.b.iv., as specified in Operating Unit Group 10, Appendix 10.15 of this Permit (as approved pursuant to Permit Condition III.10.J.3.d. and in accordance with III.10.K.1.b.xii. and III.10.K.1.c.xi.), are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.F. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste.

2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.D (as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10.J.3.d.v). Feed-rate of organics as measured by TOC are held within the range of the average value over the previous twelve (12) months. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit Condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.J.5.f.

B. Within sixty (60) days of Ecology's approval of the DFETP, or within thirty-one (31) months of commencing operation pursuant to Permit Section III.10.K, whichever is later, the Permittees will implement the DFETP approved, pursuant to Permit Condition III.10.K.1.h.i.A.

C. The Permittees will resubmit the DFETP, approved pursuant to Permit Condition III.10.K.1.h.i.A, revised to include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for dioxin and furan emission test as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. at twenty-four (24) months from the implementation date of the testing required pursuant to Permit Condition III.10.K.1.h.i.A.and at reoccurring eighteen (18) month intervals from the implementation date of the previously approved DFETP. The Permittees will implement these newly approved revised DFETPs every thirty-one (31) months from the previous approved DFETP implementation date or within sixty (60) days of the newly Ecology approved revised DFETP, whichever is later, for the duration of this Permit.

D. The Permittees will submit a summary of operating data collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.i.A and C to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified as specified in WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

E. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.i.A and C show that one or more of the performance standards listed in Permit Condition III.10.K.1.b., with the exception of

Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the HLW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s) as specified in Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were met during the demonstration test, if any such mode was demonstrated.
5. Based on the information provided to Ecology by the Permittees, pursuant to Permit Conditions III.10.K.1.h.i.E.1 through 4 above, and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan pursuant to Permit Condition III.10. K.1.h.i.E.6.
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

F. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.i.A and C show that any emission rate for any constituent listed in Permit Table III.10.K.E, as approved/modified pursuant to Permit Conditions III.10.C.11.c. or d., is exceeded for HLW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21;
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance and submit a report of the investigation findings to Ecology within fifteen (15) days of this discovery of exceeding the emission rate(s); and
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under

operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

III.10.K.1.h.ii Non-organic Emission Testing

A. Within forty-eight (48) months of commencing operation pursuant to Permit Section III.10.K, the Permittees will resubmit to Ecology for approval the "Previously Approved Demonstration Test Plan" revised as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan (RDTP) will include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, projected commencement and completion dates for emission testing to demonstrate performance standards specified in Permit Conditions III.10.K.1.b.ii., iii., v., vi., and vii., and non-organic emissions as specified in Permit Table III.10.K.E, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d., under "Normal Operating Conditions." "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d., that were established to maintain compliance with Permit Conditions III.10.K.1.b.ii., iii., v., vi., and vii., and non-organic emissions, as specified in Permit Table III.10.K.E, as specified in Operating Unit Group 10, Appendix 10.15 of this Permit (as approved pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d.), are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.F. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste; and
2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.D, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d. The average value is defined as the sum of all rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit Condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.J.5.f.

B. Within sixty (60) days of Ecology's approval of the RDTP, or within sixty (60) months of commencing operation pursuant to Permit Section III.10.K, whichever is later, the Permittees will implement the RDTP approved pursuant to Permit Condition III.10.K.1.h.ii.A.

C. The Permittees will resubmit the RDTP, approved pursuant to Permit Condition III.10.K.1.h.ii.A, revised to include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for emission test as a permit modification in accordance with

Permit Conditions III.10.C.2.e. and f. at forty-eight (48) months from the implementation date of the testing required pursuant to Permit Condition III.10.K.1.h.ii.A. and at reoccurring forty-eight (48) month intervals from the implementation date of the previously approved RDTP. The Permittees will implement these newly approved revised RDTP, every sixty (60) months from the previous approved RDTP implementation date or within sixty (60) days of the newly Ecology approved revised RDTP, whichever is later, for the duration of this Permit.

D. The Permittees will submit a summary of operating data collected pursuant to the RDTPs in accordance with Permit Conditions III.10.K.1.h.ii.A and C to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified pursuant to WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

E. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.ii.A and C show that any emission rate for any constituent listed in Permit Table III.10.K.E, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d., is exceeded for HLW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance and submit a report of the investigation findings to Ecology within fifteen (15) days of this discovery of exceeding the emission rate(s).
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and III.10.K.F.

F. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.ii.A and C show that one or more of the performance standards listed in Permit Condition III.10.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the HLW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified in Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).

4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were met during the demonstration test, if any such mode was demonstrated.
5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.K.1.h.ii.F.1 through 4 above, and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan pursuant to Permit Condition III.10.K.1.h.ii.F.6.
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

III.10.K.1.h.iii Other Emission Testing

A. Within seventy-eight (78) months of commencing operation pursuant to Permit Section III.10.K, the Permittees will resubmit to Ecology for approval the "Previously Approved Demonstration Test Plan" revised as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan (RDTP) will include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, projected commencement and completion dates for emission testing to demonstrate performance standards as specified in Permit Conditions III.10.K.1.b.viii. and ix., and emissions as specified on Permit Table III.10.K.E, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d., not addressed under Permit Conditions III.10.K.1.h.i. or ii. under "Normal Operating Conditions." "Normal Operating Conditions" will be defined for the purposes of this permit Condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified on Permit Table III.10.K.F, as approved/modified pursuant to Permit Condition III.10.J.3.d. and III.10.C.11.c. or d., that were established to maintain compliance with Permit Conditions III.10.K.1.b.viii. and ix., and emissions as specified on Permit Table III.10.K.E, not addressed under Permit Conditions III.10.K.1.h.i. or ii. as specified in Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.3.d., and in accordance with Permit Conditions III.10.K.1.b.xii. and III.10.K.1.c.xi. are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.F. The average value is defined as the sum of all rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste; and

2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.D, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d. Feed-rate of organics as measured by TOC are held within the range of the average value over the previous twelve (12) months. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time.
The average value will not include data obtained when not processing dangerous and/or mixed waste.

   For purposes of this permit Condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.J.5.f.

B. Within sixty (60) days of Ecology's approval of the RDTP, or within ninety-one (91) months of commencing operation pursuant to Permit Section III.10.K, whichever is later, the Permittees will implement the RDTP approved pursuant to Permit Condition III.10.K.1.h.iii.A.

C. The Permittees will submit a summary of operating data collected pursuant to the RDTPs in accordance with Permit Condition III.10.K.1.h.iii.A to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified as specified in WAC 173-303-807(8), in accordance with Permit Condition WAC 173-303-680(2) and (3).

D. If any calculations or testing results show that one or more of the performance standards listed in Permit Condition III.10.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the HLW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.10.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were met during the demonstration test, if any such mode was demonstrated.
5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.K.1.h.iii.D.1 through 4 above, and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan, pursuant to Permit Condition III.10.K.1.h.iii.D.6.

6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions II.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

E. If any calculations or testing results show that any emission rate for any constituent listed in Permit Table III.10.K.E, as approved/modified pursuant to Permit Condition III.10.C.11.c. or d., is exceeded for HLW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21;
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of the exceedance of the emission rate(s); and
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

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Table III.10.K.A - HLW Vitrification System Description

Sub-system Description	Sub-System Designation	Engineering Description (Drawing Nos., etc.)	Narrative Description, Tables, and Figures
RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.K.A will be completed in accordance with Permit Condition III.10.J.5.e x., prior to initiating Permit Condition III.10.K.1. See Permit Table III.10.J.A for the current HLW Vitrification System Description.

Table III.10.K.B - HLW Vitrification System Secondary Containment Systems Including Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specification Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.K.B will be completed in accordance with Permit Condition III.10.J.5.b.vii., prior to initiating Permit Condition III.10.K.1. See Permit Table III.10.J.B for the current HLW Vitrification System Secondary Containment Systems Including Sumps and Floor Drains.

[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.K.C - HLW Vitrification System Process and Leak Detection System Instruments and Parameters

Sub-system Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Failure State	Expected Range	Instrument Accuracy	Instrument Calibration Method No. and Range
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.K.C will be completed in accordance with Permit Condition III.10.J.5.e.ix., prior to initiating Permit Condition III.10.K.1. See Permit Table III.10.J.C for the current HLW Vitrification System Process and Leak Detection System Instruments and Parameters.

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Table III.10.K.D – Maximum Feed-rates to HLW Vitrification System (RESERVED)

Description of Waste	Normal Operation
Dangerous and/or mixed waste Feed Rate	RESERVED
Ash Feed Rate	RESERVED
Total Chlorine/Chloride Feed Rate	RESERVED
Total Metal Feed Rates	RESERVED

Table III.10.K.E – HLW Vitrification System Estimated Emission Rates (RESERVED)

Chemicals	CAS Number	Emission Rates (grams/second)
RESERVED	RESERVED	RESERVED

TABLE III.10.K.F - HLW Vitrification System Waste Feed Cut-off Parameters* [1](RESERVED)

Sub-system Designation	Instrument Tag Number	Parameter Description	Set-points During Normal Operation
RESERVED	RESERVED	RESERVED	RESERVED
*A continuous monitoring system will be used as defined in Permit Section III.10.C.1. [1]Maximum Feed-rate will be set based on not exceeding any of the constituent (e.g., metals, ash, and chlorine/chloride) feed limits specified on Table III.10.K.D. of this Permit			

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